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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Development of British Trade

IN a message which Sir Philip Lloyd-Greame, M.P., the head of the Department of Overseas Trade, has been good enough to address to us in reference to the chemical exhibits at the British Industries Fair, emphasis is laid on the importance of co-operative action in securing adequate publicity and on the part which mutual assistance and knowledge between members of the trade may play in furthering their individual businesses. These two points are of fundamental importance in the development of British trade, especially overseas, and the growing recognition of their importance is a distinct sign of progress in business mentality and methods. Publicity, alone, as it is understood to-day, is a new branch of industrial organisation. In many large concerns it is applied as scientifically as any other recognised section of the works machinery for the attainment of definite and calculated results. Such results, which take the form of inquiries, introductions, and negotiations, leading up ultimately to actual orders for goods, come as naturally as effects usually follow causes if the methods are rightly chosen. They must, however, be the right methods; they must be continuous and cumulative; they must be directed into the right channels. That a growing number of readers of THE CHEMICAL AGE recognise these conditions as sound is shown by the fact that this number, which will be widely circulated overseas, carries a larger volume of chemical trade announcements than any previous issue, and probably than the current issue of any other chemical journal published in this country, though we are not yet three years old.

Co-operative action among British manufacturers cannot be too strongly insisted on. British chemical industry, like every other national industry, must ultimately stand or fall as a whole. Its success means the success, in varying proportions, of every firm engaged in it; its failure similarly is bound to react upon every constituent. It has taken some years to induce the habit of looking at such matters from the collective point of view, but the efforts are now bearing fruit and will do so more and more as time goes on. Coincidently with this development of collective action, there has been a diminution of the exclusive and divisive spirit among competitive producers. Something has really been gained when Sir Philip Lloyd-Greame can truthfully quote "mutual assistance and knowledge between members of a trade" as among the factors that "further their individual businesses."

Steam in Works Processes

IN the utilisation of steam, whether for power or the many other works processes in which it is essential, there can be little question that—a few commendable examples apart—we are a nation of confirmed wastrels. We stand, however, by no means by ourselves, for wherever one goes one is struck by the apathy which is displayed in connexion with so commonplace and familiar an object as the boiler, and also by the volume of literature which is periodically served up to bring us to account for our delinquencies with steam raising. The pity of the whole situation is that our own immense natural resources of fuel have promoted a disposition to regard it as material beneath consideration from the economic standpoint. We find it difficult to take seriously the *dicta* of those who would impress us with the vital necessity for conservation, and for the most part the efforts of the "conservationists" fall on barren soil. To meet trouble half-way is, fortunately, not one of our characteristics, and we refuse to recognise difficulties until they show themselves in material form. For all that, it is time we began to appreciate the true significance of the correct utilisation of fuel, and to attempt to put into practice some of the more simple precepts which are urged upon us by those who are in a position to know what they are talking about.

In this country we have our various steam users' associations, whose reports deserve far wider recognition than they receive, while the work done by similar bodies in other countries provides a great deal of valuable auxiliary knowledge. One can point, for instance, to the recent report of a special French committee which has been studying the fuel problem from the standpoint of the steam user.

This report has been drafted by M. Kammerer, who remarks at the outset that we are concerned not only with the heat content of steam, but also with its heat quality, including in the latter term such characteristics as pressure, temperature, degree of saturation, and superheat. In chemical works one is frequently concerned with the transmission of steam over fairly long distances, and it is in such cases where the more material losses are likely to occur; and where, if one has knowledge of a few simple golden rules, steps may be taken to minimise such losses. More attention, for example, should, says M. Kammerer, be given to the question of steam velocity where steam is used for heating purposes, and in this respect he quotes a figure of from 100 ft. to 160 ft. per second. The design of pipe-lines is also accorded attention (the prime necessity being the avoidance of all sharp bends or sudden changes of section), while the general application of steam to drying and heating processes is helpfully discussed. In this connexion emphasis is laid on the economy obtainable by the use of higher temperatures when conditions allow, more especially when hot air is utilised as a heating medium. The advantages of heating with exhaust steam are also dealt with, as are processes of evaporation and concentration under vacuum. It would at least appear from M. Kammerer's remarks that the combined problem of using steam for motive power and industrial processes—a problem which takes very varied forms—must demand considerable modification of the types of plant now employed.

Students' Societies

A MEETING is to be held on Tuesday next to inaugurate the Institute of Chemistry Students' Association (London). The objects of the Association are to arrange meetings of registered students of the Institute which will discuss matters of professional and student interest, provide lectures, arrange exhibition evenings, social evenings, debates, visits to works, and generally promote the interests of registered students of the Institute. This movement should be very useful in promoting the general organisation of the profession, since it will tend largely to the encouragement of professional *esprit de corps*. We have noticed from time to time the excellent work which is being done by the chemical societies of the colleges, notably at the Royal College of Science, at Finsbury, and at University College, but the new Association has a wider field to cover. It will endeavour to co-ordinate and co-operate with these societies so far as possible, and should increase the interest in them, but we anticipate that the meetings will serve a more useful purpose by bringing students from the different colleges into touch with one another. These students in after-life will be working as colleagues or as competitors, and the mutual contact at meetings of the Association should promote the sense of good fellowship which is associated with the members of the older professions, such as the Bar, who are brought together intimately during their student days. Professional men always have a natural and very proper pride in their Alma Mater, but we fear that the slow progress of the recognition of chemistry as a profession has in large measure been due to a lack of an inborn pride in the profession and to a lack of closer touch between the students and the qualified members of the profession, such as is provided by the rules of the new Association. The Association will, moreover, develop in young chemists the art of public speaking, an art which has not been too well developed by chemists in the past.

There can be no doubt that the Institute and the profession of chemistry have benefited enormously by the formation of local sections. The new Association provides, in effect, a local section for the London students, and it is to be hoped that something similar may be done in the provinces, wherever there is more than one college at which students are training for the profession of chemistry. We wish every success to the movement.

Agricultural Research

SOME useful results may, no doubt, be expected from the adoption by the Council of the Royal Agricultural Society of the report of their Chemical Committee in favour of developing the scientific side of the society's activities. We rather sympathise, however, with the criticism of the decision on the ground of its limitation to "practical" problems. The society, recognising that research falls into two classes, gives the first place theoretically to research without reference to utilitarian ends. This class, the Chemical Committee acknowledge, has not only enlarged the bounds of human knowledge, but has also, in many cases, led to results of the highest technical value. It is a little disappointing to find the council treating this fundamental aspect of research as beyond its powers, and turning instead to the much narrower form of applied experiments of a kind which are already being conducted by any number of other organisations.

The four "practical" problems suggested for investigation are (1) the value of ground mineral phosphates, more particularly in the improvement of pasture; (2) the use of various forms of lime in grass and tillage crops; (3) the use of wild clovers, trefoil, &c., in laying land down to grass and improving existing pastures; and (4) the profitable utilisation of whey. The last, we are told, involves experiments in the extraction of lactose on a commercial scale, and, as one of the witnesses in the recent lactose inquiry explained, is already being investigated in a Government factory; while the other problems are not strikingly original. Under the direction of a committee of eight these questions are to be tackled in a "practical" way. In addition, the results of past experimental work, scattered through many volumes, and the *Journal*, are to be collected, collated, and republished—with the prospect of literary and scientific results which we fear will not be over-exciting.

Cream of Tartar and Lactose Decisions

As the result of prolonged and costly inquiries, the referee under Part I. of the Safeguarding of Industries Act has decided, on separate complaints, that (1) cream of tartar, tartaric acid, and citric acid, and

(2) lactose R. have been wrongly included by the Board of Trade in their list of dutiable articles, and consequently for the future will come in free. In the second case the final ratification of the award is deferred for a week to enable the Board of Trade to consider the question of an appeal. Considering the enormous expenditure of time and money the inquiries have already involved, the public and the trade will probably view such a suggestion with justifiable impatience. The decision has been given and should be accepted. If the Board of Trade resist it, the main effect will be to provide Parliamentary critics of the Act with an extra supply of munitions to be directed mainly against the Board's own position. In these cases the referee seems to have had less difficulty in arriving at a decision, having at last been able to strike some sort of balance between the conflicting expert and documentary evidence.

On the day these decisions were announced another inquiry should have been opened into a complaint that barium peroxide has been wrongly included in the list. In this case, however, Messrs B. Laporte, Ltd., the manufacturers chiefly interested, announce that they do not intend to proceed in the matter. As the result of a consultation with some of the largest consumers an arrangement, satisfactory to all interests concerned, has been reached, and the process of a long inquiry is thus avoided. The parties to this understanding are to be congratulated on their good judgment and good feeling.

Chemical Conferences in France

We are officially informed that the third International Conference of the Union Internationale de la Chimie Pure et Applique will take place this year at Lyons, starting on June 27, and finishing on July 2. The management of the union is now vested in the Federation Nationale des Associations de Chimie de France, and the latter body has chosen Lyons as the seat of the conference, and has appointed a local committee to make the necessary arrangements for the visit of the delegates. Beside the meetings of the international delegates to the union, the programme will include two important special conferences, organised by MM. Louis Lumière and Jean Perrin for the industrial technologists of Lyons. Arrangements have been made for visits of inspection to important local industries and factories, chief among them being the silk and tanning industries. On the conclusion of the conference the delegates will proceed to Marseilles, where they have been invited to take part in the second congress of the Chimie Industrielle, which will occupy the following week, July 2 to July 7. At this congress many important questions are to be discussed including those relating to the soap and fat industries, and to the mineral, vegetable and animal resources of the French colonies, which are of special interest to Marseilles. Technologists and research workers who have discovered new or have improved upon already known processes are invited to reserve the disclosure of such discoveries for the attention of the Congress. The only matter for regret in these excellent arrangements is the fact that the dates partly overlap those of the annual meeting of the Society of Chemical Industry, which begins in Glasgow on July 4, and that in consequence several British leaders of chemical industry who might otherwise have attended will be prevented from doing so. Another year it may be possible to avoid this regrettable confusion.

Points from Our News Pages

Sir Philip Lloyd-Greame, M.P., head of the Department of Overseas Trade, sends to The Chemical Age a message on the chemical exhibition at the recent British Industries Fair. An article on the development of British trade overseas is also published (pp. 372).

Several reviews of recent books and letters to the Editor appear on pp. 374.

A report by a committee on the standardisation of jacketed pans is published, together with specially drawn tables of dimensions and tests (p. 382).

The Board of Trade Returns for February indicate increases in the export of sulphuric acid, sodium sulphate, and zinc oxide (p. 380).

Mr. Cyril Atkinson, K.C., the Referee under Part I. of Safeguarding of Industries Act, has decided that (1) cream of tartar, tartaric acid, and citric acid, and (2) lactose R have been improperly in the Board of Trade list of dutiable articles. In the second case the final signing of the award is deferred for a week (p. 382).

In his first Cantor lecture on "The Constituents of Essential Oils," Mr. G. Radcliffe entered a plea for the establishment of a research association for the perfume industry (p. 377).

Some extracts are given from a lecture before the Institute of Chemistry by Mr. H. Ballantyne on "Chemists and the Patent Laws" (p. 384).

Several new results were announced at a meeting on Friday, March 17, of the Manchester Section of the Society of Dyers and Colourists (p. 386).

Our London Chemical Market report records an improvement in the demand for chemicals during the past week and a fairly satisfactory volume of business for near delivery.

In our Scottish Chemical Market report, the past week is described as one of fairly good local trade, though consumers continue to buy from hand to mouth.

The Calendar

Mar. 27	Royal Society of Arts: Cantor Lecture, II.: "The Constituents of Essential Oils." 8 p.m.	John Street, Adephi, London.
28	Institute of Chemistry Students' Association. 7.30 p.m.	30, Russell Square, London.
28	Royal Photographic Society: Technical meeting. 7 p.m.	35, Russell Square, London.
30	Chemical Society: Annual General Meeting, 4.30 p.m. Informal meeting, 8 p.m.	Burlington House, Piccadilly, London.
30	Society of Dyers and Colourists, W. Riding Section: "The Theory and Practice of Piece Scouring." Dr. S. A. Shorter.	Bradford.
30	Society of Chemical Industry, Manchester Section: "The Relation between Chemical Constitution and Antiseptic Action in the Coal Tar Dyestuffs." T. H. Fairbrother and A. Renshaw. 7 p.m.	College of Technology, Manchester.
31	Royal College of Science Chemical Society: "Modern Methods of Photographic Development." K. C. D. Hickman.	Royal College of Science, S. Kensington.
31	Society of Dyers and Colourists, Manchester Section: "The Progress of the Artificial Silk Industry in 1921." Professor E. Bronnert. 3.30 p.m.	College of Technology, Manchester.
31	Society of Dyers and Colourists: Annual dinner. 6.30 p.m.	Midland Hotel, Manchester.
31	The Sir John Cass Technical Institute: "Recent Developments in the Glass Industry." W. E. S. Turner and S. English. 7.30 p.m.	Jewry Street, Aldgate, London.
April 1	Royal Institution: "Radioactivity." Lecture V. Sir E. Rutherford. 3 p.m.	Albemarle Street, Piccadilly, London.

FOREIGN OFFICE AND BOARD OF TRADE.

DEPARTMENT OF OVERSEAS TRADE
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17th March 1922.

Sir,

A very notable feature of the successful British Industries Fair which has just closed has been the display of British Chemicals. On all hands reference was made to the comprehensive nature of the display and to the important part which it must play in the progress of the industry in the coming year.

That such a fine exhibit of the Chemical industry was possible was very largely due to the fact that my Department received the whole-hearted support and active co-operation of the Association of British Chemical Manufacturers, and of the Technical Press.

Two most important lessons can, I think, be learned from the excellence of the Chemical Section and I can only hope that they will be taken closely to heart by the trade.

The first is that it is only by such co-operative action that adequate publicity can be secured; and the second that mutual assistance and knowledge between members of a trade can do much to further their individual businesses.

The thanks of all British Chemical and Dyestuff manufacturers are, I think, due to their Association and to Mr. W.J.U. Woolcock, C.B.E., M.P. its General Manager who has also acted as their representative on the British Industries Fair Exhibitors' Advisory Committee.

Yours faithfully,

P. Lloyd-Greame

The Editor,
"The Chemical Age",
8, Bouverie Street,
E.C.4.

Development of British Overseas Trade

How Seller and Buyer are Brought into Touch

THE Fine Chemical industry, which is developing so rapidly in this country, may rightly be said to be in many ways in its earliest infancy. The difficulties which formerly rendered it impossible profitably to manufacture in the United Kingdom so many classes of chemicals have been very largely overcome, and the result is seen in the steadily increasing volume of production and the extension of the range of chemicals produced. Yet this progress is, it is hoped, but the first results of the early efforts of this resuscitated industry and will be far surpassed in the not far distant future. It is necessary, however, that a long view be adopted.

While it is natural that the average manufacturer in the first instance lays his plans primarily to enter the home market and capture a share of that trade, it is not sufficient for the industry as a whole to rest content with looking upon overseas markets merely as possible outlets for goods surplus to home requirements. For the industry to expand until it reaches a strong and sound economic basis, it is necessary that its exports should be large and that it should capture and hold certain overseas markets at least. A spasmodic export policy, largely dictated by fortuitous circumstance, will never attain this desirable end.

For the manufacturer who has undertaken the production of new lines, or who is for the first time seriously giving his attention to securing overseas outlets, the question of first entering and securing a foothold in those markets presents very considerable difficulties. It is in this respect, among others, that the Government, through its Department of Overseas Trade, is able to tender material assistance. This Department maintains in all important markets officers of its overseas intelligence system. Through these officers it is not only able to supply the intending exporter with all the necessary information (*e.g.*, general market conditions, probable competition, tariffs, &c.) to enable him to determine as to his chances of a successful entry, but can supply the names of firms which would be likely to import his goods. Further, if representation is desired, the Department can furnish names of firms or individuals considered suitable to act in such capacity.

There is a further facility offered, which, in view of the present promising position of the industry, is likely to be of increasing importance, as the quality of British products becomes better known. This is the ability to place in touch with each other intending overseas buyers and British sellers by means of a confidential service provided by the Department. Through the medium of this service specific inquiries for goods and notifications of trade openings reported by the overseas officers are distributed to those manufacturers who are most likely to be interested. Viewed from the standpoint of either the British manufacturer or merchant desiring to place his goods and the buyer desiring to fill his requirements, this facilitating of the opening of relations is an advantage which neither can afford to neglect. It is safe to state that already certain lines manufactured in the United Kingdom are superior in quality even to those produced in Germany, hitherto looked upon as the country holding undisputed supremacy in the manufacture of these goods. It is practically as safe to assert that with the passing of time the above may be said of an increasing number of lines. The overseas buyer who desires to purchase goods of finest qualities cannot, therefore, remain indifferent to British products. He has, however, never formerly considered this country as a source of supply nor is he in any way in touch with or probably even aware of the firms manufacturing the lines in which he is interested. Application to the Department's representative in his country, however, affords a speedy solution to the difficulty and he is immediately in a position to approach the British firms in question without difficulty or loss of time. For this purpose, the overseas officer is fully equipped with information as to the details of the manufactures of United Kingdom firms which have been prepared and classified by the Department in a form which will enable either the most specific or out-of-the-way inquiries to be directed promptly into the proper channels.

This process of bringing into touch British traders and overseas buyers is one the importance of which can scarcely be minimised, and both sellers and buyers are strongly urged to make full use of the facilities thus freely offered.

There are, in addition, numerous other activities undertaken by the Department for the purpose of assisting British manufacturers and traders in their endeavours to expand their overseas trade, but space does not allow that these be dealt with. Nevertheless, there is one feature of the Department's activities which should be mentioned. A constant flow of notifications of specific openings for trade reaches the Department. There are various ways by which these openings are brought to the attention of British firms. One of these methods is through the service mentioned above, but that which is of particular interest as indicating the high degree of co-operation between the Department and the trade and technical press of the United Kingdom is the throwing open of the columns of the latter to act as a medium for giving publicity to information of such character which is received by the Department.

Practically all branches of the trade and technical press have indicated to the Department their desire to assist it in its endeavours to promote British trade. Consequently, this valuable information receives the widest possible publicity, and from communications received by the Department from British firms it can definitely be stated that this publicity has resulted in bringing to this country very material volumes of trade which otherwise might well have gone to foreign traders.

The relationship between the Department and the chemical industry itself is of the most cordial character. The Department and the Association of British Chemical Manufacturers are in close and constant touch, and, as a result, the Department has ever before it the industry's point of view, and is thus in a strong position for rendering to the industry every such assistance as may lie within its province.

The Department cordially invites inquiries from all United Kingdom chemical manufacturers and merchants, as well as those engaged in all other trades, and from all overseas buyers desirous of obtaining supplies from this country. The Department, whose only bias is in favour of British trade as a whole, does not in any way restrict, control, or interfere with the manner in which business is done, and the trader in a small way of business can rest assured that his inquiry will receive full and prompt attention equally with inquiries from larger firms.

The Structure of the Atom

BENN BROTHERS, LTD., announce the issue of "The Structure of the Atom: Notes on some Recent Theories" (1s. 6d.), by Dr. Stephen Miall, based on a series of recent articles contributed to THE CHEMICAL AGE. This little book sets forth in a clear and interesting style, but none the less scientifically, some modern ideas which should prove of great interest not only to the scientist but to the general reader. Many who read them when they appeared will appreciate the opportunity of possessing them in booklet form.

Overcome by Fumes

ENTERING a tar still at the Sunderland works of Brotherton & Co., Ltd., on Wednesday, Mr. T. H. Dougherty was overcome by the fumes and died. Mr. G. Rogers, another employee, who tried to rescue him, also lost his life.

Reviews

RICHTER'S ORGANIC CHEMISTRY. Edited by PROFESSOR R. ANSCHÜTZ and DR. H. MEERWEIN and Translated from the Eleventh German Edition by DR. E. E. F. D'ALBE. Vol. II. Chemistry of the Carbocyclic Compounds. London: Kegan, Paul. Pp. 760. 35s.

The new English edition of the second volume of Richter's well-known treatise, which has been translated by Dr. D'Albe, has attained such corpulence by successive additions and editions that it is doubtful if the original author would recognise in this somewhat bloated product the modest little octavo volume which he brought into the world in the early eighties of last century.

It is true that organic chemistry has vastly extended its boundaries since his day and added constantly to its store-house of new compounds; but it is by no means certain that in its present form the treatise serves its original purpose as a text-book for students. For a book, one volume of which is represented by more than 700 pages of closely-printed details of compounds, their formulæ, properties, and preparation, is obviously not for study. On the other hand, as a book of reference it has much to recommend it.

It possesses, nevertheless, certain defects. In the first place, the index is very incomplete. It contains no reference to certain fundamental matters (rules of substitution, general reactions, methods of separation, &c.) which are mentioned in the text and not indexed, and in the particular section which we have more carefully examined (the terpenes) the index contains neither bornyl chloride nor isobornyl chloride.

Referring to the additions to the new volume the present authors state that "the exceedingly numerous researches made in the entire field of terpene chemistry have necessitated an almost complete reworking and a partial redivision in particular of the dicyclic terpenes."

We have out of curiosity turned to this section, and although it contains a large amount of new material, many important recent discoveries are omitted.

There is no mention of the true pinene hydrochloride recently obtained by Aschan, nor of epicamphor, prepared by Perkin & Titley, nor of the synthesis of fenchone, fenchene, or santene by Komppa, Ruzicka, and others, nor of Ruzicka's method for the partial synthesis of pinene, and for the preparation of pure bornylene. Moreover, the arrangement into hydrocarbons, alcohols, ketones, &c., renders the relation between the members difficult to grasp. In alluding to the work of English chemists reference is made to a journal denominated "*C.*," taken to stand for the *Centralblatt*, *i.e.*, a German journal of abstracts. There seems no tangible reason for referring in an English book for English readers to the German abstracts of English papers, especially when the original sources—Berichte or Annalen—of the German references are given, and we can only suppose that it has been done by the translator to save himself trouble.

Moreover, no one would suspect in reading this section that Professor W. H. Perkin, whose brilliant contribution to the synthesis of the terpenes has done so much to elucidate their structure, had any connexion with the subject, for his name neither appears in the text nor in the index referring to this section. Finally, we would draw attention to certain printer's errors which have crept into some of the formulæ; thus on p. 510 three out of the four formulæ have each a bond missing, and the same omission was observed on p. 517.

Although we have felt it our duty to point out what appear to be certain defects, the popularity and usefulness of the book are unquestioned, and it will continue to hold its position as an important book of reference. J. B. C.

THE ELEMENTS OF FRACTIONAL DISTILLATION. By C. S. ROBINSON. 1922. New York: McGraw-Hill Book Co. Pp. ix., 205. Figs. 41. 12s. 6d. net.

As the author indicates in the preface, the subject of fractional distillation has received sparse treatment in the English language. Possibly this may, in part, be due to the general excellence of the work written by Sidney Young. There is, however, no doubt that a large field exists for works of a physico-chemical nature dealing with the technical side of condensation and distillation, and it is in this respect that the chief value of the present work lies.

A short statement of the Phase Rule is followed by notes of the more important physical laws concerned. From a mathematical consideration of the design and functions of a fractionating column we are drawn to a comparison of intermittent and continuous distillation. Examples are given of the separation of pure ammonia from crude liquor, of crude benzol from benzolised oil, and of methyl and ethyl alcohols from wood spirit and fermented liquor. A set of tables, comprising boiling points of various substances at different pressures, of various binary mixtures, and of constants connected with steam distillation, with a very considerable bibliography, complete the book. The latter should be invaluable, and gives the book a distinct claim for reference purposes.

The scope of the book might well have been extended on both the theoretical and the practical sides, although in the latter respect a further work is promised. Condensation might, perhaps, have been more fully dealt with independently of distillation to cover processes where fractional condensation of the complex mixture of products derived by destructive distillation is of great practical significance. Steam distillation is so generally used that something more in this respect would have been welcome. Allowing for insular prejudices, the book is well written; but even so, it is hard to see why the names of substances should sometimes be given capitals and not at other times. The same applies to the use of formulæ in the letterpress. The name of Clapeyron loses an "e" before the end; while in the references the *Chimie et Industrie* appears as *Chemie et industrie*. In several cases indicating signs do not appear in the accompanying figures (Cf., Figs. 5, 13). On p. 28 the term 100° is obviously meant for (100x). In the equation on p. 35 the figures representing the molecular weight of water have been reversed. The explanation of Fig. 14 seems to apply more to the previous diagram, while that of Fig. 40 is difficult to follow. Such errors, while not of great importance in themselves, lead to exasperation on the part of the reader.

Reviewing the book as a whole, it is certainly a clear and most useful work. It will be all the more important if it leads to the more scientific design of distillation plants in this country. The book can be recommended without hesitation to those whose duty it is to design, as well as to those who must study and control, such plants. G. W.

BLEACHING AND RELATED PROCESSES AS APPLIED TO TEXTILE FIBERS AND OTHER MATERIALS. By J. MERRITT MATTHEWS, Ph.D. New York: The Chemical Catalog Company (Inc.). 1921. Pp. 676. $8.

This is a bulky volume of nearly 700 pages packed full of practical information. The impression left on the reader is that of a thoroughly serviceable, well selected, and well arranged mass of material compiled from the best available sources rather than a work based on the outcome of a craftsman's own experience; in fact, so wide a field is covered that no single craftsman could have acquired detailed experience of all the processes described.

The principal sections dealing with wool, silk, and cotton are excellent, and form more than three-fourths of the book. Not only are the ordinary bleaching methods and the processes preliminary to bleaching, such as the scouring of wool and the de-gumming of silk, clearly and accurately described, but a sufficient account is also given of less usual methods applicable in special cases. An elementary knowledge of chemistry is assumed and the chemical basis of each operation indicated, but the author does not go deeply beyond this into the chemistry of his subject.

The section dealing with the bleaching of substances of minor importance is less admirable and bears traces of hasty compilation. For example, the statement in connexion with straw-plait that this material can be bleached by boiling with dilute caustic soda, followed by treatment with bleaching powder solution at 1°-2°Tw. and a final scouring, is obviously due to confusion with the bleaching of straw pulp in the paper-making industry; the method described would lead to the virtual destruction of straw-plait in the first operation. It is not the case, as implied in another paragraph, that a satisfactory bleaching method for plait by means of chlorine compounds has yet been devised.

Other substances coming under the author's survey are linen, jute, artificial silk, feathers, horn, ivory, and sponges. A few notes on gelatine bleaching, an operation of some importance, might well have been included. The bleaching of leather is dismissed in a few lines as an operation never carried out, whereas leather bleaching by means of hydrosulphite is successfully practised, and reference might also be made to the so-called "bleaching" process in which lead sulphate or other white pigment is precipitated on the leather.

These are, however, but small blemishes in a valuable work of reference, which deserves universal recognition as a standard text-book on the subject of bleaching. R. B. B.

BLEACHING: A RÉSUMÉ OF THE IMPORTANT RESEARCHES ON THE INDUSTRY PUBLISHED DURING THE YEARS 1908-1920. By S. H. HIGGINS, M.Sc. Manchester: The University Press. 1921. Pp. 136. 10s. 6d.

The scope of this volume is adequately described by its sub-title, if this is taken in conjunction with the author's remarks in his preface that reference is confined to the bleaching of vegetable fibres, and that the book may be considered as a contribution to the study of cellulose. The author is well known as one who has devoted himself to research on the subject of cellulose bleaching, and he now summarises his own results and those of other workers in the same field, indicating where agreement and diversity occur between the results and conclusions of the investigators. It forms a useful work of reference, bringing together a mass of material hitherto available for the most part only in the files of technical and scientific journals. The author's staccato style and occasional faulty punctuation mar to a slight extent the perusal of an interesting and valuable compilation. R. B. B.

THE EMISSION OF ELECTRICITY FROM HOT BODIES. Second Edition. By O. W. RICHARDSON, F.R.S. (Monographs on Physics.) London: Longmans, Green & Co. Pp. 320. 16s.

At first sight the subject with which this volume deals might be expected to be of little interest to chemists. There are, however, many results scattered through the earlier chapters which have chemical significance, while the last two chapters are entitled "The Emission of Ions from Heated Salts" and "Ionization and Chemical Action." These chapters give a very interesting and critical *résumé* of the work that has been done on the emission of ions during chemical change. The physical methods employed enable the experimenter to follow these changes quantitatively, and show that in addition to the end products, which can be recognised by appropriate chemical tests, there are frequently intermediate changes not otherwise recognisable. To give one example only: Garrett found that when zinc iodide is heated there is an emission of positive and negative ions, which, at constant temperature, rises to a maximum and then decreases. The time-activity curve obtained can be represented by a mathematical formula which implies the initial formation of an inactive product which subsequently decays (*i.e.*, changes into a third substance) with the emission of ions. Readers of this journal will find that acquaintance with this excellent treatise will suggest numerous problems for research. R. S. W.

A Defence of British Dyes

To the Editor of THE CHEMICAL AGE.

SIR,—By a decisive vote the House of Commons has just rejected a proposal that the Dyestuffs Act of 1920 should be repealed and for the benefit of the general public perhaps you will allow me to elaborate this retort to arguments as fragile as any that have ever been advanced in a serious assembly.

Complaint was made of the circumstance that, during the past year, the British dye industry has been "unable to make any profits." I freely confess that it is not possible to meet criticism of such a sort. Would those who bemoan our profitless twelve months have been any the less doleful had we had a year's prosperity? On the contrary, one can almost hear the violence of the denunciation which would have been directed at the makers of dyes had they been passing through fat days in these lean times for dye-users.

Happily, our detractors have descended from a vague exclamation against our general incompetence to particular instances of that incompetence at work. We are given two definite cases of the "monstrous prices" levied by British dye-makers as compared with their German competitors. One is the charge of 2s. a pound for synthetic indigo, which can be purchased from abroad at 8d.; the other is the already celebrated case of Lithol Red, to be had at 9s. a pound from Germany, as against the Monolite Red English substitute at 16s. As far as synthetic indigo goes, the German could sell it at 3d. if he liked for payment in British currency.

The difference in price is, indeed, so much an affair of a depreciated currency, that the 8d. charged by Germany represents a normal 4os.! To a proportionately greater extent is this true of Lithol Red, the raw material of an English lake, although the figure of 16s. is not strictly accurate, the lowest English price being now 14s. 4d. British manufacturers ought to see that if they plead for the admission of the components of English lakes, there is nothing to prevent the admission of German lakes to compete against them.

When it is remembered that the House of Commons case against the Dyestuffs Act rested upon nothing more substantial than the flimsy figures to which I have referred, what is remarkable is not, it seems to me, that the proposed repeal of the Act should have been rejected, but rather that 115 legislators, apparently sober-minded, could have been persuaded to support so thin a case.—Yours, &c., WM. ALEXANDER,

Chairman, British Dyestuffs Corporation, Limited.

Imperial House, Kingsw[illegible], W.C. 2.

The Dyestuffs Act

To the Editor of THE CHEMICAL AGE

SIR,—Will you allow me to comment upon the speech by Lieut.-Commander Astbury in the House of Commons, in opposing the repeal of the Dyestuffs Act, which is reported in your columns? (THE CHEMICAL AGE, March 18). Here we have a private manufacturer who seems not to need the scapegoat, the Dyestuffs Act. His works are fully employed and booked up for some time ahead. Why is he in this happy position? My own ideas are these. He is one of the private manufacturers. Such men fill the position of owner and employer. They are also the directorate—chairman included. They have no fixed salary; what they get they must make by their own shrewdness, energy and foresight. Success is their ambition; to fail means their own loss, not other people's. If, for any reason, they must support certain friends, relatives, and associates, they conclude that it is often better to "keep" them out of the business, than in it.

A man in this position knows well that he cannot deal with all matters in detail, so he requires that the position and conditions should be presented to him in a form that he can see at a glance whether costs, quality and quantity of work, damages, allowances, upkeep, &c., are going better or worse. If they are going the wrong way, he requires explanation. Such a man, on being told "It is the Dyestuffs Act," would most likely retort, "You didn't go to Germany for your high explosives and poison gas during the war, did you?" He might even add, "No, you sent them some!" He will put the responsibility of running the works on his manager, who, in his turn, knows well the peril of failure, to prevent which he must have a staff of experienced men.

Compare this with the state of some of those who try to take cover behind the Dyestuffs Act. Did they make much

headway before the war, before the Dyestuffs Act was thought of? If the shareholders would demand to have one member on the directorate of every company to look after the shareholders' interests, things would begin to improve. Such a member should be paid by results that would make him feel as though he owned the whole business. I expect he would begin by cutting out that part of the staff which was employed in preventing the other part from getting along with things that mattered. He would tear down the network of sinecures, reduce the appalling waste of labour and materials and excessive costs, procure the most efficient men, encourage experiment with the idea of reducing process and yet be wary of change. In a word, get the type of man who "on his own" would, had he the capital, have built up a big industry. An alternative would be to pay all directors by results.—Yours, &c.,

A PAST MANAGER.

Neutralisation of Sulphate

To the Editor of THE CHEMICAL AGE

SIR,—The paper read by T. Johnson, B.Sc., at a meeting of the North of England Section of the Coke Oven Manager's Association on February 25, a report of which appears in your issue of March 4, I have read with the utmost interest.

Mr. Johnson stated that by simply washing the sulphate with water in the centrifugal it was not found possible to reduce the free acid content to 0.025 per cent. with less than 2½ gallons of water per cwt., that the contents of the centrifugal drier as treated by this method were not found to be uniform throughout in composition, certain portions being neutral while other portions showed high acid content. From this it might be inferred that the simple washing of the sulphate with water in the centrifugal and the production of a dry neutral sulphate on such lines is an impossibility. I therefore venture to bring to your attention certain facts well demonstrated, which, I think, prove conclusively that it is feasible to attain a very high efficiency in the removal of free acid from sulphate of ammonia and a satisfactorily dried product with the simplest possible plant.

In making this statement I should like to make it clear that the results to which I refer were obtained on sulphate of ammonia produced from ordinary ammoniacal liquor. It is well-known that it is possible to work up a very considerable volume of mother liquor and washings in an ordinary saturator. Such may not be possible under the direct recovery process on which Mr. Johnson's results were based.

I am quite prepared to admit that unless precautions are taken in the regulation of the density of the liquor in the saturator a finely divided crystal might be produced which would not be readily washed with water in the centrifugal, but a little investigation will readily determine the best saturator conditions for producing a comparatively large crystal which parts with its mother liquor freely, and which is very readily washed in the centrifugal. This seems to me a point which has been largely overlooked in evolving many of the neutralising and drying plants which have been installed in recent years. Mr. Johnson found it impossible to reduce the free acid content to 0.025 per cent. with less than 2½ gallons of water per cwt., but the figures which I am about to submit were obtained when using not more than 1 gallon per cwt. of sulphate in a centrifugal capable of discharging 4 cwts. of sulphate per operation. Under these conditions not only is it possible to work up all the washings produced in the centrifugal, but an added quantity of water is required in the saturator. On this particular plant the ammoniacal liquor averages not less than 2°Tw. and the results during two years' working have demonstrated that a dry sulphate, satisfactory both in the matter of acid content and moisture, may be regularly produced without any difficulty.

The following are results taken out for three six-monthly periods and one period of three months :—

	6-mos. period.	6-mos. period.	6-mos. period.	3-mos. period.
Aver. per cent. ammonia	25.52	25.51	25.56	25.58
" " " free acid .	0.019	0.015	0.020	0.017
" " " moisture .	0.62	0.65	0.38	0.34

In treating the sulphate with water in the centrifugal it is essential that this water should be very hot and that the sulphate should be discharged after washing and whizzing promptly. If the hot sulphate thus produced is passed on to a simple screen for the purpose of breaking up the sulphate into crystals and preventing the discharge of this in lumps, and if this hot sulphate is allowed to fall from the screen a matter of, say 10 or 12 ft. into the boot of the elevator conveying the sulphate to the sulphate store, and, if further, this elevator is so designed as to give the sulphate another fall on to the floor of the sulphate store itself it will be found that the moisture content is easily reduced to the figures set out above. No hot air-drying need be resorted to. If it is desired to keep the temperature of the sulphate store, particularly in winter weather, at such a point as will ensure the prevention of frost or very cold conditions in the building, then the fixing of a heating pipe through which the exhaust steam from the engine on the centrifugal may be passed will secure this result.

These figures, as already stated, are based on actual working, and are not simply theoretical, and I should have no hesitation in guaranteeing the production of sulphate of ammonia under this system containing less than .02 per cent. of free acid and 0.7 per cent. of moisture.

During the past few years innumerable papers have been read and patents taken out, covering the neutralising and drying of sulphate of ammonia, many of these involving elaborate and costly apparatus, demanding in operation a considerable amount of attention and consumption of fuel. It was very properly pointed out by one speaker in the discussion subsequent to the reading of Mr. Johnson's paper, that the chemical engineering difficulties in the question had been much exaggerated. It is the business of the chemical engineer to effect the desired results with the simplest possible plant and a minimum of expenditure, and I venture to submit that money is being wasted on, and much energy devoted, to the exploitation of neutralising and drying plants, when many of these are altogether unnecessary.—Yours, &c.,

SCOTIA.

Galled Anti-Typhoid Tablets

To the Editor of THE CHEMICAL AGE

SIR,—With reference to the note which appeared in your esteemed Journal of December 3, 1921, we beg to draw your attention to the fact that experiments on a very large scale have been successfully carried out with Professor Besredka's Galled Anti-Typhoid Tablets, and we shall be glad if, for the benefit of your readers, you will kindly give publication, through the columns of your Journal, to the following :

At a meeting of the Congress of Hygiene held at the Pasteur Institute on December 28, 1921, Dr. Vaillant, Medical Inspector of the Health Department of Pas-de-Calais, reported that at a recent outbreak of a typhoid epidemic in a few villages in the devastated regions of Pas-de-Calais, he put Besredka's Anti-Typhoid tablets to an exhaustive test with the result that out of 1,236 persons vaccinated by oral administration of these tablets, only two persons contracted typhoid in a mild form on the tenth day following, and one of these two cases was of a very doubtful diagnosis. Simultaneously 173 persons in the same district were vaccinated by subcutaneous injections T.A.B., and out of these four contracted typhoid between the fifth and tenth days following, whilst out of about 600/650 non-vaccinated, fifty cases of typhoid were registered.

The respective proportions can more clearly be seen from the table below :—

	No. of Typhoid cases.		%
Non-vaccinated	600/650	50	7.7
Vaccinated by means of T.A.B. ..	173	4	2.3
Vaccinated by means of Galled Anti-Typhoid tablets	1236	2	0.17

It is only too evident that the absorption of these tablets will be much more easily accepted by the general public of any affected area than vaccination through the medium of subcutaneous injections T.A.B., as the former presents no counter-indications, causes none of those ailments which frequently oblige vaccinated persons to interrupt their usual occupation, and the immunity which it confers is at the very least equal to that obtained by subcutaneous methods. The above results were considered of such efficacy that the Paris Academy of Medicine has now authorised the general use of this new method of vaccination by oral administration.—Yours, &c.

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New Chairman of Southall Brothers and Barclay

MR. THOMAS BARCLAY has been appointed chairman of Southall Brothers & Barclay, Ltd., manufacturing chemists of Birmingham, in succession to the late Sir Thomas Barclay.

Constituents of Essential Oils

Research in the Perfume Industry

MR. GUY RADCLIFFE, M.Sc.Tech., F.I.C. (Lecturer in Applied Organic Chemistry, College of Technology, Manchester), delivered the first of three Cantor lectures on "The Constituents of Essential Oils," at the Royal Society of Arts, on Monday.

Defining an essential oil as a more or less oily aromatic substance, which differed very much from ordinary fatty oils in that it was volatile, the lecturer then dealt with the sources of essential oils. It was regrettable, he said, that the essential oil industry in this country was not in a very advanced condition, although many firms were doing extremely well in the industry. The British Empire produced nearly everything in the essential oil industry, but we had not made use of our resources as we should have done.

After briefly referring to the history of the distillation of essential oils, which started from the remotest antiquity, the lecturer went on to the geographical distribution of the oils. The Forestry Department in India, in co-operation with the Imperial Institute here, was going into the matter, and research was being carried out at the laboratories at Debradun, under the direction of Dr. Simonsen, which could not fail to be of importance to the Empire. Similar work was also being done in Australia, New Zealand, and other parts. At the present time the perfume industry, as all others, was having a very anxious time, but there was no doubt that the many difficulties would be overcome, and when we acquired a proper understanding of the raw materials available within the Empire, the skill and enterprise of our chemists would raise an industry second to none in the world. That meant research, however, and he commented on the fact that he had not heard anything about the creation of a properly constituted research association for the perfume industry. Such a research association should be created, because the carrying out of research on essential oils was a very expensive thing. It was very nearly impossible for private firms to carry out extensive researches unless they had plenty of money, and carried them out in that spirit of discovery where success from a monetary point of view was of secondary consideration.

Extracting Perfumes from Flowers

The lecturer then briefly surveyed the methods of extracting perfumes from flowers, and showed a number of slides depicting the various stages of manufacture in this country, France and Italy. Dealing with lavender, he said there was no doubt that English lavender was absolutely pre-eminent. The industry in this country was chiefly concentrated around London, and he mentioned Stafford, Allen & Sons, of Finsbury, as being typical manufacturers. Another source of essential oil was the English dill fruit, from which the oil was distilled in this country. In Italy and Sicily was concentrated the production of orange, lemon and bergamot, the oils from which were so sensitive to heat that it was not really possible to make them by any process of distillation. In the case of orange, the peel was taken off and squeezed, and the oil was squirted out on to a sponge.

Mr. Radcliffe then discussed the manufacture of perfumes from various plants and woods. The town of Grasse, on the Riviera, was the centre of the French floral perfume industry, and we had not within the Empire anything approaching that industry, although there was no reason why we should not. A number of slides illustrated the methods of distillation of the various oils. The French lavender had not the same odour as the English, and it was chemically different. In this connexion he mentioned the controversy which took place some years ago with regard to what was called the ester theory. It was suggested by the Germans that lavender oil should be valued on its percentage of ester, *i.e.*, it should be valued chemically, without reference to smell. That would have been a good thing both for the French and German lavender, because if it were distilled under certain conditions a high ester content could be obtained. There was no question, however, that the British lavender was the best from the perfume point of view. The amount of oil obtained from lavender in England was about 1 lb. from 56 lb. of flowers.

English peppermint and rosemary were two of the most perfect essential oils in the country, and the odour differed from that given by the flowers grown anywhere else. In the case of rosemary, about 24 ounces of oil were obtained from 112 lb. of the fresh herb. The production of neroli oil from orange blossom in France was very costly, and 1 ton of blossoms would yield less than 40 oz. of the oil. Again, from 8,000 to 10,000 lb. of rose blooms only yielded about 1 lb. of French otto of rose. The otto of rose produced in France was not so good as that produced in Bulgaria before the war, because the recipe was intended to apply to Bulgarian roses, which were different from the French. The jasmine flower was much too delicate to be submitted to distillation, and further, the flower was continually giving off perfume. The method of manufacture was based on the principle of placing the blooms between trays covered with fat, which fat absorbed the perfume. The perfumed fat was called a pomade. Another method was to dip the flowers in melted fat, and let them drain, the fat taking the perfume from the flowers. Another process used very largely nowadays was that in which the flowers were washed with volatile solvents, such as petroleum ether and other low boiling liquids, which dissolved out the odorous materials. Later the solvent was distilled, leaving behind a highly odorous residue, containing the perfume in a concentrated form, mixed with other things. One of these other things was a floral wax, the removal of which left very little perfume.

Use of Petroleum Ether Solvents

Going back to the fats previously mentioned, which were saturated with perfume from blooms, and which were the raw material for the manufacture of odorous substances, the lecturer described how the fatty material was stirred for a long time in cold alcohol, which dissolved the perfume substance. That alcoholic liquid was then filtered, and became a concentrated solution of the perfume; by the evaporation of this alcoholic solution a mixture of substances which constituted the perfume in a highly concentrated condition was obtained. Such residues were very costly. As to the method of extraction with petroleum ether solvents, the solutions were evaporated at the lowest possible temperature, and from the residues so obtained highly concentrated perfumes resulted. The processes were more or less trade secrets, but the perfumes obtained were the nearest approach to the flowers that could be got, and the lecturer emphasised the very great amount of skill and experience required in carrying out these processes. He also impressed upon his audience the very large quantities of flowers which had to be used in order to get small quantities of perfumes, and the necessarily high cost of them. The production of perfumes necessitated not only the isolation of the constituents from the plants but the mixing of those constituents in the same proportions as those in which they existed in the natural plant. We in this country had neve had a knowledge of the modifying effects of these smal natural products which existed in the natural flowers.

The perfumes obtained by the petroleum ether process were very costly, and people could not afford to buy them. Hardly any of these odours were now on the market in the pure state for this reason, and in order to reduce the price manufacturing firms had let them down to the extent of at least 40 per cent. with something which did not smell. The liquids used for letting the substances down were ethylorthophthalate or methylorthophthalate.

What is a Scientific Instrument?

ON March 18 Mr. Cyril Atkinson dealt with a complaint put forward by Mr. E. W. Schwegler, on behalf of the Loga-Calculator, Zurich, that this calculator had been improperly included in the Safeguarding of Industries list as a scientific instrument which was subject to the tax.

Mr. Weibel, on behalf of Mr. Schwegler, submitted that the calculator was an instrument which could be used by ordinary unscientific people to do difficult calculations, its action being largely mechanical. The ordinary slide rule, he said, was a scientific instrument, and needed more skill to operate.

The Referee said the definition applied to the instrument and its maker, not to its user, and great skill was required in the manufacture of such an instrument as the Loga-Calculator, which, according to its advertisement, "did in six minutes what the brain required thirty minutes time, almost seven hundred written figures, and more than nine hundred thoughts' to perform. He held, therefore, that it was properly included in the list.

Research Students at Cambridge

IN a report on the admission of research students the Board of Research Studies at Cambridge University states that steps have been taken to concentrate in the board the power of admission of research students, and it is hoped that this will tend towards the preservation of a uniform standard of qualification. The number of research students admitted when the last report was presented was seventy-two. Since hen seventy-one have been admitted, making in all 143.

Standardisation of Jacketed Pans

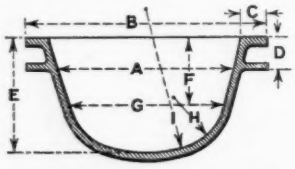
Report by Committee of Experts

THE sub-committee on the standardisation of jacketed pans recently appointed by the Joint Research Committee on Chemical Plant of the Association of British Chemical Manufacturers and the British Chemical Plant Manufacturers Association have just issued a full and detailed report on the results of their investigations. This report, which is signed by Mr. Charles S. Roy as chairman, states that the sub-committee have dealt with cast-iron pans as requiring the most urgent need for standardisation. A series of drawings was sent out to all chemical manufacturers, showing various shapes and flanges and a *précis* of the replies was then forwarded to all the plant makers for their approval of the settled design. The committee have endeavoured to meet all their requirements, and have endeavoured to design a standard pan of maximum efficiency in respect of heating surface, working capacity and strength. As a result of the inquiry of the chemical manufacturers it was agreed that for these types of cast-iron and enamelled cast-iron pans the standard working capacity should be calculated from the underside of the bolting flange of the liner (that is the heating capacity). The actual capacity is greater. For instance, the 25 gallon deep pan has a working capacity of 25 gallons, and an actual capacity of 34 gallons. Thus a manufacturer knows he can work 25 gallons in a standard 25 gallon pan, and not about 18 gallons as hitherto.

After very careful examination the committee decided on a two-radii pan which they put forward as meeting the requirements. The metal being cast-iron, it was found impossible to stipulate one thickness, as it is obvious that the iron and the casting of different foundries would vary. In order to surmount this difficulty, and also to cover another point raised on further inquiry from chemical manufacturers that a higher working pressure would be an advantage, the sub-committee have stipulated limits of thickness. For 35 lb. working pressure the thickness of the metal must be within the limits stated, but for a 40 lb. or 45 lb. working pressure the thickness of the metal must be the outside limit stated on the drawings. This the committee venture to think will overcome the two difficulties, but, of course, the tests of the pans for the two pressures must be different.

The committee have also taken into consideration the possibilities of fitting wrought metal linings to the jackets, and has reluctantly come to the decision, after prolonged examination, that it would be impossible to design cast-iron jackets for all the sizes considered that would meet the wrought metal conditions. It is suggested, however, that the deep patterns up to and including the 100 gallon pan (*i.e.*, 10, 25, 50, and 100 gallons deep patterns) are suitable for replacement of the cast-iron by a wrought metal liner. The cast-iron liners are designed for enamelling, and the committee draw attention to the thickening of the metal at the flanges. This is considered to be important and calculations have been made so as to give sufficient metal for radiation to be gradual at the non-heated contact points. The edges have been rounded to enable the enamel to be run perfectly on the inside edge so as to form one clear run of enamel for the working of the pan, that is, so that the enamel will not flake off and iron show when a stirrer is used on this edge. The lugs for the feet have

Cast Iron and Enamelled



DIMENSIONS—

LINERS.																			
WORKING CAPACITY. GALLONS.	ACTUAL CAPACITY. GALLONS.	"A" DIAMETER AT FULL WORKING LEVEL.	"B" DIAMETER OVERALL.	"C" WIDTH OF FLANGE.	"D" HEIGHT OF FLANGE.	"E" DEPTH.	"F" DEPTH OF 1ST RADIUS STRIKING POINT.	"G" DIAMETER AT STRIKING POINT.	"H" FIRST RADIUS.	"I" SECOND RADIUS.	THICKNESS OF METAL. 35 LBS. □" WORKING PRESSURE.	THICKNESS OF METAL. MINIMUM FOR 40-45 LBS. □ W.P.	THICKNESS OF BOLTING FLANGE.	THICKNESS OF PROTECTING FLANGE.	DIAMETER OF BOLT CIRCLE.	SIZE OF BOLT HOLES.	SIZE OF BOLTS.	NUMBER OF BOLTS.	
25	43	3'-1½"	3'-9"	3"	3¾"	1'-2¾"	—	3'-3"	1'-4"	2'-9"	½" - ⅝"	⅝"	1"	⅞"	3'-7"	⅞"	¾"	32	SHALLOW.
50	73	3'-7"	4'-3"	4"	4¼"	1'-7¼"	—	3'-7"	1'-3"	2'-4"	⅝" - ¾"	¾"	1⅛"	1"	4'-1"	⅞"	¾"	40	
75	112	4'-3¼"	5'-2"	4½"	4½"	1'-9"	—	4'-5"	1'-10"	3'-4"	¾" - ⅞"	⅞"	1⅛"	1⅛"	5'-0"	⅞"	¾"	48	
100	139	4'-5¼"	5'-2"	4"	4½"	2'-0"	—	4'-6"	1'-11"	3'-6"	¾" - ⅞"	⅞"	1⅛"	1⅛"	5'-0"	⅞"	¾"	48	
10	15	1'-10¼"	2'-4"	2½"	3¾"	1'-1⅞"	7⅛"	1'-9⅜"	4"	1'-5"	⅞" - ½"	½"	⅝"	¾"	2'-2½"	11⁄16"	⅝"	20	DEEP.
25	34	2'-3"	2'-10½"	3⅜"	3¾"	1'-8¾"	1'-2¼"	1'-11¾"	7"	2'-3"	½" - ⅝"	⅝"	1"	⅞"	2'-8½"	⅞"	¾"	24	
50	63	2'-8¾"	3'-5"	3¾"	3¾"	2'-2¼"	1'-6¼"	2'-4⅞"	9"	2'-5"	½" - ⅝"	⅝"	1"	⅞"	3'-3"	⅞"	¾"	28	
100	128	3'-5½"	4'-3"	4"	5½"	2'-9½"	1'-11½"	3'-0"	10"	2'-9"	⅝" - ¾"	¾"	1"	1"	4'-1"	⅞"	¾"	40	
150	180	3'-6½"	4'-3"	4"	6"	3'-5"	2'-4"	3'-4¾"	1'-1"	2'-10"	¾" - ⅞"	⅞"	1⅛"	1⅛"	4'-4"	⅞"	¾"	40	
200	233	3'-6½"	4'-3"	4"	6"	4'-5"	3'-4"	3'-3¾"	1'-1"	2'-9"	¾" - ⅞"	⅞"	1⅛"	1⅛"	4'-4"	⅞"	¾"	40	

Working pressure 35 lb. per sq. inch. Dimensions as above. Hydraulic test at 75 lb. per sq. inch. Steam test after Hydraulic test at working pressure for half an hour. Working pressure 40-45 lb. per sq. inch. Hydraulic test at 90 lb. per sq. inch. Steam test 45 lb. per sq. inch for half an hour.

all been cast on to the jacket with a strengthening web, and the inlets and outlets have been made in unison with the size of pan. The water drain is in the centre of the bottom of the jacket, and not at the side as hitherto. It is generally agreed that the latter practice is wrong. The committee have not shown the steam distributor which, in their opinion, is best inserted at the bottom where the steam space is greatest and where there is less risk of uneven expansion of the liner. Bosses are cast on the jacket on the upper edge for safety valve and air blow off. Should a chemical manufacturer desire steam inlet on the top, which in the opinion of the committee is wrong, a baffle plate must be inserted. These steam distributors or baffles have not been dealt with as the committee do not consider that they require standardising. The steam space in every case has been carefully calculated and graduated for a steam inlet at the bottom of the pan so that steam entering the jacket shall cause the rise of temperature to be as even as possible.

The sub-committee wish to draw especial attention in the first place to the 75 and 100 gallon shallow pans. It has been found that these large sizes are not universally used in cast-iron and enamelled iron. This applies particularly to the 75 gallon size, and the committee have, therefore, designed the 75 gallon lining to fit into the 100 gallon jacket, making only one jacket necessary for these two sizes. In this way it is hoped to save another unit of the standardisation. Secondly, especial attention is drawn to the fact that the 50 gallon shallow pan and the 100, 150, and 200 gallon deep pans have all the same diameter of flange on the liner, so that the universal cover the committee are at present considering will fit one and all of these pans. In this respect the committee have also taken into consideration that this deep type of pan would make an admirable still, and it is on the agenda of the sub-committee to consider these pans with outlets so that all the pans could be converted immediately into a still, or a still into an open pan, using the one standard cover. Of the vast number of designs that have been considered the committee venture to present these as the final outcome of their deliberations. Every design has been carefully investigated and calculations of strength considered. In the opinion of the committee, the specifications herein proposed will insure plant of maximum efficiency.

The sub-committee put forward the suggestion that the tests for the enamelled cast-iron pans be as follows, and a certificate of these tests be issued with every pan :—

CAST-IRON STEAM JACKETED PANS.

A. For a working pressure of 35 lb. to the square inch shape to be as per drawings.
Thickness of metal to be within the limit stated on the drawings.
The hydraulic test of 75 lb. to a square inch.
Steam test after hydraulic test at working pressure for at least half an hour.

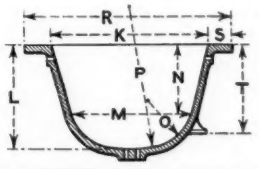
B. For working pressure of 40-45 lb.
Shape as per drawings, thickness of metal in this case to be the greater thickness stated on drawings.
Hydraulic test of 90 lb. per square inch.
Steam test, 45 lb. per square inch of half an hour.

ENAMELLED CAST-IRON STANDARD STEAM JACKETED PANS.

Tests as above, with the exception of the steam test, which is to be as follows :—

The pan to be filled to limit capacity with cold water, steam applied to jacket at the working pressure and the contents boiled. After boiling from five to ten minutes the

—AND TESTS



Cast Iron

JACKETS.																	
"K" INSIDE DIAMETER.	"L" INSIDE DEPTH.	"M" DIAMETER AT STRIKING POINT.	"N" DEPTH OF STRIKING POINT.	"O" FIRST RADIUS.	"P" SECOND RADIUS.	THICKNESS OF METAL. 35 LBS. □" WORKING PRESSURE.	THICKNESS OF METAL. MINIMUM FOR 40-45 LBS. □" W.P.	THICKNESS OF FLANGE.	"R" DIAMETER OVERALL.	"S" WIDTH OF FLANGE.	SIZE OF STEAM INLET.	SIZE OF CONDENSE OUTLET.	SIZE OF SIDE OUTLETS.	STEAM SPACE AT INLET.	SUPPORTING BRACKETS. NUMBER.	SUPPORTING BRACKETS. THICKNESS.	SUPPORTING BRACKETS. DISTANCE "T"	
3'-3½"	1'-0⅞"	3'-3½"	—	1'-4"	2'-9"	⅝"-¾"	¾"	1"	3'-9"	2¾"	¾"	¾"	½"	1½"	3	¾"	11"	SHALLOW.
3'-9½"	1'-5½"	3'-9½"	—	1'-4¾"	2'-3¼"	¾"-⅞"	⅞"	1⅛"	4'-3"	2¾"	1"	1"	½"	2"	3	⅞"	1'-2½"	
4'-8"	1'-10½"	4'-8"	—	2'-0½"	3'-3"	⅞"-1"	1"	1⅛"	5'-2"	3"	1"	1"	½"	5½"	3	⅞"	1'-6½"	
4'-8"	1'-10½"	4'-8"	—	2'-0½"	3'-3"	⅞"-1"	1"	1⅛"	5'-2"	3"	1"	1"	½"	2½"	3	⅞"	1'-6½"	
2'-0"	1'-0 1/16"	1'-11⅝"	5 1/16"	6"	1'-5½"	7/16"-½"	½"	⅞"	2'-4"	2"	½"	½"	¼"	1½"	3	½"	10"	DEEP.
2'-5"	1'-6⅞"	2'-2⅝"	10"	9"	1'-8½"	½"-⅝"	⅝"	1"	2'-10½"	2¾"	¾"	¾"	½"	1½"	3	⅝"	1'-4½"	
2'-11¼"	2'-0⅞"	2'-7¾"	1'-2⅞"	10½"	2'-2½"	⅝"-¾"	¾"	1"	3'-5"	2¾"	1"	1"	½"	2"	3	¾"	1'-10"	
3'-9"	2'-6⅞"	3'-4½"	1'-6"	1'-0½"	2'-6"	¾"-⅞"	⅞"	1"	4'-3"	3"	1"	1"	½"	2½"	3	¾"	2'-3"	
3'-11"	3'-2½"	3'-11"	1'-10"	1'-3¼"	3'-0¾"	⅞"-1"	1"	1⅛"	4'-6"	3½"	1"	1"	½"	3"	4	⅞"	2'-11"	
3'-11"	4'-2½"	3'-11"	2'-7¼"	1'-3¼"	3'-0¾"	⅞"-1"	1"	1⅛"	4'-6"	3½"	1"	1"	½"	3"	4	⅞"	3'-11"	

Tests as for cast iron except steam test, which is as follows: Pan to be filled with cold water to limit capacity, steam applied at working pressure, and the water boiled. After boiling from five to ten minutes, the water to be removed and the steam to be kept applied for at least fifteen minutes.

water to be removed, steam to be kept applied for at least fifteen minutes to show up pinholes, flaking, or crazing.

Attached to the report is a letter to the A.B.C.M. from Mr. C. le Maistre, secretary of the British Engineering Standards Association, in the following terms :—" I am happy to inform you that the detailed drawings which have been submitted to this association have been approved by my association's chemical sub-committee on the handling and treatment of liquids and gases, and this committee will be pleased to proceed forthwith with the preparation of necessary specification, with a view to its issue as a British standard. I am desired to assure you that my Association highly appreciates the very thorough manner in which the work done by the joint committee on the standardisation of jacketed pans has been carried out."

The report contains a large number of working diagrams, together with tables of dimensions and tests which have been redrawn for THE CHEMICAL AGE, and are reproduced on pp. 378-79.

February Trade Returns

Increased Exports of Sulphuric Acid

THE general trade position as reflected in the Board of Trade Returns for February was dealt with in THE CHEMICAL AGE last week, when it was pointed out that in many cases an expansion of trade is, in some cases, concealed by the fall in prices during the last year. Imports of chemicals, drugs, dyes and colours during February were £613,157 less than in the corresponding month last year, while exports show a decline of £443,668. A comparison of the figures for the month under review with those for January indicates an increase in imports of £79,404 and a decline in exports of £457,910 ; in this case some allowance must, of course, be made for the shortness of the former month.

Imports of Chemicals and Drugs

Dealing with quantities, and making a comparison between February and January of this year, the only imports showing increases are borax, potassium compounds other than nitrate, zinc oxide, and sodium nitrate ; in each case the increase was considerable. The detailed figures, in cwts., are given below with the January figures in parentheses : Borax, 500 (50) ; potassium compounds other than nitrate, 300,275 (145,071) ; zinc oxide, 465 tons (241) ; sodium nitrate, 124,756 (45,880). The decreases, similarly compared, are : Acetic acid (including acetic anhydride), 253 tons (328) ; tartaric acid, including tartrates not elsewhere specified, 451 (1,270) ; bleaching materials, 2,376 (3,327) ; calcium carbide, 45,172 (57,197) ; crude glycerine, 3,168 (3,606) ; distilled glycerine, 778 (828) ; red lead and orange lead, 1,229 (1,503) ; potassium nitrate, 3,501 (9,962) ; sodium compounds other than nitrate, 9,516 (14,418) ; and cream of tartar, 24 (115).

Heavy Decline in Sodium Compounds

The chief increases in exports during the month were in sulphuric acid, sodium sulphate and zinc oxide. On the other hand there was a general decrease of nearly 300,000 cwt. in sodium compounds, while there was a heavy fall in tar oil, creosote, &c. The following figures show in detail the products, the exports of which indicate increases over the January figures ; the latter are given in parentheses, and the amounts are in cwts., unless otherwise stated : Sulphuric acid, 6,990 (909) ; anthracene, 20 (nil) ; benzol and toluol, 4,767 gallons (1,597) ; carbolic acid, 11,073 (10,188) ; naphthalene, 2,546 (2,541) ; coal tar products not elsewhere specified, 29,474 (13,119) ; potassium chromate and bichromate, 2,005 (566) ; potassium compounds not elsewhere specified, 5,656 (3,028) ; sodium chromate and bichromate, 2,823 (2,521) ; sodium sulphate, including saltcake, 68,556 (26,886) ; and zinc oxide, 127 tons (73).

Dyes and Dyestuffs

Imports of alizarine were more than twice as large as in January, while extracts for dyeing, other than cutch also showed increases. There was a considerable decrease in tanning extracts and cutch. Figures showing an increase are : Alizarine, 4,231 (2,017) ; dyeing extracts other than cutch, 5,642 (4,879) ; and natural indigo, 239 (nil). Imports of finished coal tar dyestuffs, other than alizarine and synthetic indigo, were 2,321 cwt. against 3,066 ; cutch, 1,356 against 3,257 ; and tanning extracts, 60,875 as compared with 81,281. There was a decline in exports of dyes and dyestuffs, the total for the month being 6,916 cwt. valued at £48,251 as compared with 9,494 cwt. of the value of £73,747 exported in January. Some idea of the masking effect of reduced prices is furnished by the figures for February, 1921, which show exports of 12,429 cwt., valued at £195,633.

There was a decrease in imports of all painters' colours and materials, the grand total being 23,159 cwt. less than the January total. The comparative figures are : Barytes, ground (including *blanc fixe*), 28,987 cwt. (50,851) ; white lead (basic carbonate), 7,755 cwt. (8,042), and painters' colours, &c., other sorts, 34,517 cwt. (35,525). Exports under this heading, at 83,468 cwt. were 9,085 cwt. less than in the preceding month. Barytes (including *blanc fixe*) was exported to the extent of 4,540 cwt. as against 3,417, and prepared paints and enamels totalled 15,707 cwt. as compared with 13,837 ; white lead dropped from 17,333 cwt. to 11,025.

Scientific Instruments and Glassware

Scientific glassware (except tubing and rod) was imported to the value of £5,194 against £4,518 in January, and £19,208 in February, 1921 ; 177 cwt. of glass tubing and rod, valued at £820, was imported against 150 cwt. at £715, and 379 cwt. of the value of £4,447, admitted in the corresponding month of last year. Exports of tubing and rod amounted to 32 cwt., of the value of £285 (against 33, £454) ; while those of other scientific glassware amounted in value to £5,399, an advance of £775 on the January figures. During February we imported 70,221 gross of glass bottles and jars valued at £59,593 (compared with 94,651 gross, valued at £81,715), and exported 23,227 gross, of the value of £33,792, as against 31,973 gross, valued at £45,128. We imported during the month £19,925 worth of scientific instruments and appliances (except electrical), the largest individual supplier being the U.S.A. with £7,088, followed by Germany with £6,614. Exports under this heading totalled £75,216, British India being, for the fourth consecutive month, the largest individual purchaser shown in the returns.

Coal exports were 6,601 tons less at 4,014,334 tons, and were worth £4,446,225 as against £4,783,539. Although the quantity of coal exported in February of last year was only 1,729,148 tons the value at £4,240,620 was only £205,605 less than the figure for the month under review.

Affairs of the Herculin Glue and Compounds Co.

THE winding-up order in respect to the Herculin Glue and Compounds Co., Ltd., 9 and 11, Richmond Road, Twickenham, was made on January 17 on a creditor's petition. (*See* THE CHEMICAL AGE, Vol. VI, p. 199.) The statement of affairs shows liabilities of £733 12s. 6d., against assets of £374 13s. 7d., or a deficiency as regards the unsecured creditors of £358 18s. 11d. The issued share capital of the company amounts to £1,000, so that there is a total deficiency of £1,358 18s. 11d. The failure of the company is attributed to bad debts, depreciation of stock, and general depression. It appears that the company was incorporated on May 28, 1918, as a private company to acquire from another limited company part of their business relating to the manufacture of glues then carried on at Twickenham. The capital of the company was £1,000, divided into 1,000 shares of £1 each, the whole of which was subscribed for by directors, and fully paid up. The usual books of account have been kept, and show that for the seventeen months ending October, 1919, a profit of £206 was made, but net losses have been incurred ever since.

Presentation to Mr. William Russell

MR. WILLIAM RUSSELL, F.I.C., has just retired, after over forty years' service as teacher of chemistry, first at the Birmingham and Midland Institute and subsequently at the Municipal Technical School, Birmingham. He joined the Institute staff in 1870 as a lecture assistant, and became a lecturer in chemistry in 1877. On March 16 he was presented with an illuminated address and a cheque by his past students and members of the teaching staff. The principal (Dr. W. E. Sumpner) presided, and Mr. Waters Butler, head of the brewing firm of Mitchells and Butler (an old student), formally made the presentation and referred to the important influence of Mr. Russell's work on the training of men in the chemical industries of the Midlands.

Institute of Chemistry

Educationists' Views on the Training Scheme

At a meeting of the Huddersfield Section of the Institute of Chemistry, held on Wednesday, March 15 (Dr. H. H. Hodgson in the chair), Dr. J. Bruce, Head of the Chemistry Department, Huddersfield Technical College, gave an address on the new scheme of training in chemistry drawn up in co-operation with the Board of Education. He said that he regarded the new scheme as a very important departure which would probably have far-reaching results. It was very necessary that some central body should supervise the teaching of chemistry throughout the country; the Institute of Chemistry could act with special authority in the matter because of its precious work in setting a high standard of proficiency for its members. The new scheme, referring as it did to a grade lower than that of associate, was long overdue. Since the discontinuance of the Board of Education examinations there had been no uniform standard available, and the want had been keenly felt by teachers of chemistry. The scheme set up for full-time students a standard in their examinations lower than that required for a degree and for this he felt there was no adequate reason, on the contrary the multiplication of examinations was to be deprecated.

Part-time courses were, however, on a different footing. There the time and energy available was limited, and any instruction would be less useful than when given under the more favourable conditions of a full-time course. The regulations suggest a standard of examinations equal to that for a degree, but that required explanation. It was, however, desirable that the standard should be kept as high as possible and the number of different certificates reduced to a minimum. The certificates must be regarded as stepping stones to the associateship.

It was emphasised that in these regulations the Institute definitely assumed some responsibility in the general educational scheme of the country. The courses prescribed were grouped, and he hoped that this would ensure that in future part time education would have a greater value than in the past. The question of preliminary education was of fundamental importance, and he suggested that the prescribed preliminary education attached too much importance to chemistry and too little to literary subjects. He thought that critical judgment and the power of expressing their thoughts could best be developed in young students by a thorough training in English, while the abstruse concepts of general chemistry were unsuitable for presentation to the majority of such students. The need for adequate preliminary education was even greater with part-time than with full-time students, and its lack had been the reason for much of the past failure in teaching evening students which had led to waste of time and energy on the part of both teacher and student. To avoid this he suggested the reshaping of the preliminary work on the lines indicated and the raising of the age of admission of students to such courses.

Dr. Bruce also stated that there was at present too little facility for the transference of evening students to day courses. If the Board of Education and the Institute could co-operate and produce some scheme of scholarship for promising students the efficiency of the evening work would be greatly increased.

Friendly Criticism

The discussion was then opened by Dr. A. E. Everest, who said that there were difficulties in the scheme. The Institute already conducted examinations for the associateship, and when necessary for the Fellowship, and was now about to supervise examinations for other grades. There was a danger lest in the minds of some people these various grades might become confused, and he suggested that the danger might be avoided if it were at once made clear that these examinations were to be regarded as preliminary to or as stepping stones to the examination for the associateship, &c. The phrase "University standard" was ambiguous; such a standard was obviously reached at matriculation. He hoped that great care would be taken by the Institute to satisfy itself that the necessary preliminary education had been obtained and strongly advised the insertion of a time limit to the period within which such preliminary training might be dispensed with.

The regulations relating to full-time courses needed careful consideration; there was no reason why in three years a full-time student should not have reached the standard of a pass degree and there was a danger lest the new regulations should tempt students to refrain from taking a degree in favour of the cheaper certificate which at present had no standing. The relation between these new certificates and the Associateship should be defined at once.

In the subsequent discussion, Mr. T. Dyson, Headmaster of the Almondbury Grammar School, Mr. J. F. Hudson, Principal of the Huddersfield Technical College, Mr. S. Robson, Dr. H. H. Hodgson, and the secretary took part. It was generally felt that the new regulations did not lay sufficient stress on, or did not ensure a thorough training in, English. The importance of this for clear thinking, writing, and speaking was emphasised. For full time students it was felt that suitable qualifying examinations already existed on the external side of the London University. For part time students the existing preliminary and intermediate examinations of the Institute should, with some adaptation perhaps, prove suitable. Fear was expressed that the new certificate might be confused with the diplomas of the Institute.

A resolution proposed by Dr. Everest and seconded by Dr. Hodgson was carried unanimously and directed to be sent to the registrar.

Dr. Thackeray on Catalysis

"Catalysis" was the subject of a lecture given by Dr. J. R. Thackeray at the Science Section of the Plymouth Institution on March 13. In examining the latest discoveries in this field, and their application to industry and commerce, he dwelt on the fact that Germany, cut off from natural nitrates as she was, had yet been able to prolong the war for an extra two years by making use of what is known as the "Ostwald Process" for the oxidation of ammonia to nitric acid in the presence of the catalyst platinum. German chemists improved on this process to such an extent that in 1917 500,000 tons of synthetic ammonium sulphate were produced in Germany. In spite of this prodigious result the German method was vastly improved on by the great French chemist Claude who by devising more efficient apparatus secured by its means a higher output in less time and with the manipulation of less weight of material.

Other interesting manufacturing processes dealt with by the lecturer were the combination of sulphur dioxide and oxygen by the catalytic action of platinum (which was first used by Phillips in 1839) and the substitution of other catalysts such as ferric oxide with a little copper oxide for platinum, the manufacture of hydrogen from water gas and excess of steam; and the hydrogination of organic compounds, notably the preparation of solid fats from oils, including the manufacture of margarine, which, however, resulted in the latter case in a product in which the vitamines were destroyed.

Opening an interesting discussion, the President, referred to the extraordinary discoveries which had been recently made on the condition of many substances hitherto regarded as colloidal but now found to be crystalline.

The Social Side of Chemistry

In the King's Bench Division on Monday Mr. Justice Greer began the hearing of an action brought by Mr. George Joseph Jones, an assistant in the chemical department of University College, London, against the University of London, claiming damages for alleged wrongful dismissal.

It was stated that on March 20, 1920, there was a college dance. During an interval the plaintiff sat in a corridor with one of his pupils, a Miss Brown, aged about twenty. Later, at his suggestion, they went into the Chemistry Theatre, and while there the plaintiff admitted squeezing and kissing her. He admitted also having been in the room before with another young lady, a graduate. Sir Gregory Foster, Provost of the college, had an interview with the plaintiff on the matter, suggesting that it would be advisable for him to resign, and adding that if he did not resign the matter would have to be referred to the College Committee. According to Sir Gregory Foster's evidence, the plaintiff verbally agreed to resign, but the next morning intimated that he did not intend to do so. Sir Gregory then wrote requesting him to resign and to cease work at once. The plaintiff, it was stated, was bringing the action to clear his character.

In giving judgment Mr. Justice Greer held that the incident which came to the knowledge of the Provost quite justified Sir Gregory Foster in coming to the conclusion that such conduct on the part of the lecturer was incompatible with his position. He was therefore entitled to dismiss the plaintiff, and there must be judgment for the defendants with costs.

The Safeguarding of Industries Act

Referee's Decisions on Recent Inquiries

On Saturday, March 18, at the Board of Trade, Mr. Cyril Atkinson, K.C., the Referee, gave his decisions on the recent inquiries into two complaints under Part I. of the Safeguarding of Industries Act, namely: (1) That cream of tartar, tartaric acid and citric acid have been improperly included in the Board's list of dutiable articles; and (2) that lactose R. has been improperly included in the list. The substance of the decisions, which in each case are in favour of the complainants, is given below.

Cream of Tartar Case

In this case the complaint is that cream of tartar, tartaric acid, and citric acid have been improperly included in the Board of Trade list. They have been included as fine chemicals. The question is whether the complainants have established that such inclusion is improper. There is no scientific meaning of the expression "fine chemical." It is a trade term—that is common ground. The complainants say that there is no trade definition of the term, that it is incapable of definition, and that I must find out what the custom of the trade has been regarding the classification of the substances. The respondents say there is a definition, and that, judged by the definition, these substances are fine chemicals. Therefore, the first question is whether the term as used in the trade has a meaning definable in language that will yield a reasonably definite test for the determination of the question.

A number of trade witnesses were called to give evidence as to the usage with regard to these particular chemicals. In their view, the word "heavy" is synonymous with "industrial"; a heavy chemical is one sold solely for industrial or technical purposes. They say that the word "fine" is used in contradistinction to "heavy," but they are not prepared to say what the expression "fine chemical" means. They are supported by classifications appearing in trade lists and particularly by Merck's catalogue, where fine chemicals for the *materia medica* and the arts and fine chemicals for the laboratory are contrasted with chemicals for industrial purposes. How can one reconcile these conflicting views? So far as I can see, no two persons have the same conception of the term.

The search for a definition having failed, I turn to the question of trade usage. On the balance of evidence, I come to the conclusion that the terms "heavy" and "fine" have been used in antithesis the one to the other in this sense, that though there may be, and probably are, some chemicals which do not fall into either class, if a chemical has been classified or ought to be classified as "heavy," it is not "fine." I am satisfied on the evidence that the trade has not regarded these three substances as fine chemicals. The trade evidence called by the complainants is almost uncontradicted. I think that the trade regard heavy chemicals as commercial products mainly used for industrial purposes, and that they so regard cream of tartar, tartaric acid, and citric acid. On this point I accept the evidence of the trade witnesses for the complainants.

Their evidence was supported by a number of lists and catalogues, and by many references to trade journals and to Board of Trade reports in which these substances are treated as heavy chemicals. The evidence from the journals was not by any means all one way. Weighing up all the evidence I am satisfied and find as a fact that so far as trade usage is concerned the complainants have proved that not one of these three substances has been commonly regarded as a fine chemical. According to some expert witnesses that finding ought to settle the question. I think it does, but I propose to consider how far this trade usage is justified as judged by the evidence of the expert witnesses who, I am sure, have all done their best to help me. I am satisfied that the main use of these three substances is industrial or commercial, although there is a very substantial use of tartaric acid for saline preparations such as Epsom salts. Mr. Lankshear agreed that they were commercial products produced on a large scale, thus bringing them within Dr. Fox's definition of a heavy chemical. I think he is right. I have read and re-read two of Mr. Hill's papers. I attach the very greatest weight to them, particularly to the 1916 paper, which was written before men's minds were influenced by the passing of this Act and was, so far as I know, the first attempt to deal with, and explain, the difference between heavy and fine chemicals. The second paragraph in the 1916 paper deals with the distinction between a heavy and a fine chemical. With one trifling exception Mr. Hill agrees that not a word of the description of a fine chemical there given applies to any one of the three substances with which I am concerned. In 1916 it was clearly his opinion that the use to which a chemical was put was relevant. He pointed out the difficulty created when the same substance is used both for technical and medicinal purposes. I think the 1916 paper supports and justifies the trade classification of these substances. In my opinion, if judged by this paper, these substances are not fine chemicals.

This paper was shortly followed by a grouping of the chemical industry by the Association of British Chemical Manufacturers. Group 6 is the fine chemical group. Its description is as follows: "Analytical, pharmaceutical, photographic, rare earth, synthetic essences and perfumes, alcohol derivatives, ethers." The grouping does not cover chemicals properly described as industrial—*i.e.*, chemicals mainly used for industrial purposes. I do not think that a chemical primarily and mainly industrial can properly be described or classified as a pharmaceutical chemical merely because it has some use in pharmacy.

The main ground upon which the respondents rely is the difficulty of manufacture, the necessity for highly-skilled chemical supervision and labour constantly controlling and conducting such manufacture. I have tried to visualise the skill required in the factory of a typical fine chemical manufacturer. In practice, I gather, a fine chemical maker makes a great many different chemicals. Mr. Morson's firm makes between two and three thousand different chemicals in a year, and it seems to me that the knowledge and skill required in such a factory, both from the chemist and from the workpeople, must be of the most varied kind and totally different from the knowledge and skill required for the continuous production of one or two particular substances, such as those with which I am concerned in this case, which can be acquired simply by working at the particular operations involved. Mr. Ballantyne agrees that all that is wanted in the production of these substances is skill, *ad hoc*, and he agrees that an even higher degree of skill is required for the production of many admittedly heavy chemicals.

How, then, does the degree of skill requisite help me to settle the question? I think the skill and learning required for fine chemical production and that required for heavy chemical production rests in this, that for the former a wide and varied knowledge of the highest kind is requisite, while for the latter a knowledge limited to the production of the particular chemical is sufficient. Doubtless the same kind of skill and knowledge would be sufficient for the production of many fine chemicals considered separately and individually, but fine chemicals are not produced in that way. I think that the high degree of skill and knowledge to which witnesses point as associated with fine chemical manufacture is due to the fact that fine chemicals are produced in great numbers in the same factory and that the persons there employed must be able to produce very many such substances and must therefore have a very wide degree of chemical knowledge. In substance, I accept the evidence of the witnesses from France and Spain, although I am quite ready to believe that they have minimised their difficulties; but after discounting in that respect what they told me I am satisfied that the skill demanded in their factories of those responsible for the supervision and of the workpeople is of a different class from that required for fine chemical production. The trade committed itself to a classification of cream of tartar at a time when the methods of production described by the witnesses were general, or, at any rate, were more general than they are now and when the production here was very limited. There is no evidence that the methods they described are not those generally adopted in France, Italy or Spain. I think that the system of production as described by those witnesses must be a commercial system and that there is no real foundation for the scepticism of some of the witnesses as to the results achieved. One has only to look at the figures relating to imports to see how impossible it is to say that the method of production as carried on in France and Spain is a hit-or-miss method and not a practical commercial method. There is no doubt that the process as carried on by the three English manufacturers is much more difficult, but it is no more difficult than that required for, at

any rate, some heavy chemicals, and the skill required is certainly not of that varied character demanded by typically fine chemical manufacture.

Again, the measure of production is said to afford a test. If it is so, it is conceded that no fine chemical is produced in the same quantities as cream of tartar and tartaric acid. I am, therefore, unable to say that, as judged by the tests suggested by the respondents, it has been proved that the trade usage with regard to these chemicals is wrong or unreasonable or so wrong or so unreasonable that it ought to be rejected.

I want to apply one more test. In my opinion, the object of the Act is to protect certain key industries and I am sure that the fine chemical industry, *i.e.*, the industry carried on by fine chemical manufacturers, is one of the industries to be protected. I think that the paragraph in the schedule dealing with chemicals is intended to be a description of the fine chemical industry. I was rather struck by a suggested definition of a fine chemical in one of Mr. Hill's papers, viz., " Fine chemicals are chemicals which are made by fine chemical manufacturers." He says that the definition is not so ridiculous as it would seem at first sight. I think it contains an idea which is very helpful. Are these substances made by fine chemical manufacturers ? The only firms spoken of as making any of these substances are the respondents—the Phœnix Chemical Co., Kemball, Bishop & Co., and Lankshear, Wickstead & Co. In the official directory of the Association of British Chemical Manufacturers, published in 1919, not one of these firms appears under the heading of makers of fine chemicals, or under the heading of makers of pharmaceutical chemicals, although they do appear as makers of cream of tartar and tartaric acid. The same thing appears in Kelly's Chemical Directory, and so, too, in the " Who's Who " of the Association of British Chemical Manufacturers. Until 1921 these firms do not appear in Group 6, nor are these firms, any more than the French and Spanish firms whose factories have been described, fine chemical manufacturers in the sense in which Mr. Morson's firm are fine chemical manufacturers, nor in the sense in which that expression is generally used. The industry intended to be protected is, I think, that of the typical fine chemical manufacturer, an industry calling for the highest and widest skill, both from its supervisors and its workpeople. There is no evidence before me that any one of these substances is manufactured by any fine chemical manufacturer.

In my opinion, in the absence of a scientific or a trade definition, I have to be guided by the trade classification, if there has been one. I am satisfied that trade usage has not commonly classified these substances as fine chemicals, and I am quite satisfied that the persons who make these have not called themselves or considered themselves to be fine chemical manufacturers until quite recently. I am not satisfied that, judged by any of the tests suggested by the expert witnesses, these substances ought to be classified as fine chemicals. I therefore direct that they be excluded from the Act.

Lactose

The complaint in this case is that lactose has been improperly included in the Board of Trade list. It has been included in the pure form as a fine chemical. It is said by the complainants that lactose is not a chemical, and, if it is a chemical, that it is not a fine chemical. The word " chemical " has no scientific meaning. It is not a word used by scientific persons. They speak of chemical compounds. There is no warrant for saying that the word " chemical " as used by ordinary persons is synonymous with the expression " chemical compound " as used by scientific persons. I do not believe that ordinary persons use the word " chemical " in a sense so wide as to cover substances such as water, starch and sugar, though doubtless all these substances are chemical compounds. My present feeling is that the word " chemical " as used in this Act was not intended to cover food substances. Under Sec. II., where words wide enough to cover foods are used, foodstuffs are expressly excluded, but I need not give any definite decision about that as I am satisfied that even if lactose is a chemical it is not a fine chemical.

I need not repeat what I have said in the last case (cream of tartar). I have only to apply the tests suggested. There is not a particle of evidence that the chemical trade has ever classified or regarded lactose as a fine chemical. Judged by Mr. Hill's 1916 paper, lactose is not a fine chemical. Applying the definition of a fine chemical " one made by fine chemical manufacturers," there is, of course, only one result possible. So far from being made by fine chemical manufacturers, lactose is made by persons who do not call themselves even chemical manufacturers. Mr. Dhont's firm is known as the Milk Sugar Works of Amsterdam. The firm in the United States from which the complainants buy is known as the Sheffield Farms. Mr. Siebold's company is known as the Milk Sugar Co. I do not believe that any one of these firms ever thought of themselves as fine chemical manufacturers. The main ground urged as justifying the inclusion of lactose in the list is the difficulty of manufacture. I accept the evidence of Mr. Dhont. His firm turns out 600 tons a year without any chemical supervision of the process at all. There is a works manager who is a sugar chemist, and another chemist is employed for the purpose of analysis, but Mr. Dhont assured me most positively that the only supervision of the process is that of the foreman. In my opinion there is no evidence at all which brings the manufacture of lactose within any one of the definitions or descriptions of fine chemicals yet suggested. Logically, the result of the inclusion of lactose would be startling; if lactose is properly included, what about cane sugar ? It is just as much a chemical; it is just as pure; it is more difficult to produce. The only difference is that it is produced in greater quantities. It is difficult to see how it can seriously be urged that the inclusion or exclusion of any substance in or from the list has to depend upon the quantity of the substance produced. In my opinion, lactose is not a fine chemical, nor has it been regarded by the trade as a fine chemical, and I think it should be excluded from the list.

MR. SWAN, for the complainants, raised the question as to when the decision would be finally signed by the Referee.

MR. ASHLEY, for the Board of Trade, said that if the decision just given was to be taken as a general proposition which the Referee regarded as binding him in future cases in relation to fine chemicals, then he must ask time to consider the possibility of asking the Referee to state a case.

THE REFEREE said there were only two matters he regarded himself bound by. There was no commonly accepted definition of a fine chemical, and he did not think he ought to be asked to hear a great deal of evidence on that point again when so much had already been heard. Therefore he did not propose to hear the same class of evidence again as to the meaning of a " fine chemical." The second proposition which he was going to consider himself bound by as he went along was that the main test was trade classification. If he found there had been, as a fact, with regard to any particular chemical, a definite trade classification, then that was the main guide. If there had not been a definite trade classification, then he would be driven to apply the other tests which had been suggested. Beyond that, he did not consider himself bound by anything he had said.

MR. ASHLEY asked if it was to be understood that the Referee excluded from the term " fine chemicals " chemicals which were used for industrial purposes ?

THE REFEREE said he did not think that was so at all.

MR. ASHLEY said he must press for a fortnight in which to decide whether the Board of Trade would ask the Referee to state a case.

MR. SWAN suggested a week as ample.

THE REFEREE said there could be no question about stating a case on a finding of fact. The only point of law that emerged was whether he was right in saying that he was going to be guided by trade usage if there had been a definite trade usage. That was precisely the ruling he had laid down in the santonine case, and he thought it had been accepted. He would hold up the final signing of his award for a week.

Barium Peroxide Complaint Withdrawn

AN official notice has appeared in various trade and other journals intimating that the Board of Trade had arranged to submit the question of the inclusion of barium peroxide in the list of dutiable articles under Part I. of the Safeguarding of Industries Act for decision by the Referee appointed by the Board.

In connexion with this, we are requested by Messrs. B. Laporte, Ltd., of Luton, who are the only manufacturers of barium binoxide in England, to state that they do not intend to proceed in the matter. This decision was arrived at after consultation with several of the largest consumers, as the result of which an amicable arrangement was made satisfactory to all concerned. It is the object of Messrs. B. Laporte, Ltd., considerably to increase the capacity of their plant, as they are confident of their ability to hold their position against foreign competition, especially when the handicap due to adverse exchange no longer exists.

Chemists and the Patent Laws

By Horatio Ballantyne

We give below some extracts from a lecture delivered before the Institute of Chemistry by Mr. Horatio Ballantyne. The lecture, in which the subject is dealt with exhaustively, will presently be published in pamphlet form.

The Patenting of Inventions

THE patent laws offer advantages in a very special degree to chemists. The training and occupation of the chemist are not such as to produce the energetic, managing man of affairs. His work, as a rule, is of a contemplative nature; he is concerned more with the reactions involved in the process of manufacture and the conditions governing them, than with the devising of plant and machinery, or organisation of departments for production in quantity. Speaking generally, his contribution to improvements in chemical manufacture consists in initiating and working out, in its early stages, the fundamental principles of the process; he rarely gets further beyond that than some tests on a small scale experimental plant. There his work on the invention ceases unless, as is not usually the case, he has a natural aptitude for management and business. From that point onwards the development and daily commercial use of the process pass into the hands of the engineer or manager, who deservedly gets the credit of "producing the goods." Too often the real originator receives inadequate recognition for the success achieved; he occupies a subordinate post, called in only when difficulties arise, or for the routine control of raw materials and products. To some extent this disparity of recognition may be rectified if the chemist records the advances which he has made by patenting them. The name of the first and true inventor must appear upon the specification, and the patent thus affords for all time a definite record of his personal achievement. If the conduct of the process passes out of his hands, his name nevertheless remains coupled with it. To the young chemist his patent serves as a diploma which, whether the invention prove to be commercially valuable or not, bears independent testimony to initiative, to some measure of ingenuity, on the part of the patentee. It is always a cause of gratification when applications for admission to the Institute are accompanied by such evidence of the capacity of the candidate.

Chemists, as a rule, entertain a somewhat exaggerated idea of the quantum of originality or scientific achievement that is necessary to justify them in applying for patents. I would not wish to advocate the cultivation of a habit of rushing off to the Patent Office with every little improvement, but, on the other hand, it is not wise to allow diffidence, or a lack of a right sense of perspective, to restrain one. I have a vivid recollection of a visit, some years ago, from two chemists who are now among our most distinguished Fellows, who came, blushing like a pair of schoolgirls, to discuss whether, by chance, there was anything worthy of patenting in what was really a brilliant chemical invention which they had made. To them the process, the outcome of prolonged investigations, seemed so obvious—once it was made, and consisting as it did of the application of a known chemical reaction to a particular new purpose—that they shrank from what seemed like patenting a platitude.

The tendency of the courts, in my experience, is always to regard chemical inventions with special sympathy. The "inventive idea" is, as a rule, easier to formulate and envisage in these than in mechanical combinations.

It is not necessary that the invention be based on profound scientific conceptions or upon new reactions. Quite a small advance, judged from the purely chemical standpoint, if applied to the production of a new and useful result, may afford good subject matter. There is a class of invention which I think is apt to be overlooked by British chemists, viz., inventions which consist in improvements in detail. The investigator works away, ascertaining the best conditions of concentration, proportions, temperatures, circulation of liquids, sequence of operations, and so on, and one by one small improvements emerge which are translated into practice with, in the aggregate, a substantially beneficial effect on the purity, yield, or cost of the product. Any chemist worthy of the name takes this sort of effort as a matter of course. It is as well, however, to pause now and again on the journey up the hill and survey the scenery below from the new vantage point. Sometimes, though by no means always, it will be found that on crystallising the ideas which have served as guiding principles from stage to stage of the ascent a real inventive conception will emerge. If he can patent the whole, he will secure to himself credit which may well be lost through considering each little advance by itself.

Inventions of this kind have hitherto appeared peculiar to the German type of chemist. The most striking and familiar example was afforded by the Badische patents for the manufacture of SO_3 by the contact process. Long before Knietsch tackled the problem it was known that in order to produce SO_3 with platinum as catalyst it was necessary to purify the gases. Knietsch set himself to purify the gases thoroughly and then more thoroughly—and in truth the essence of his invention consisted in "going one better" than anyone else in following the advice of earlier writers on the subject. He also ascertained by systematic experiments the optimum temperature for the catalysis and the best strength of sulphuric acid for absorbing the SO_3 produced. Looking back upon his work, it is seen to be nothing more, either in plan or in quality, than many of you—especially those engaged in the research laboratories of our great manufacturing companies—are engaged in every day. The final outcome of these improvements was a series of real inventions of the highest merit, all bearing upon one another and producing a total result of a kind which long fascinated the chemical world. Inventions of this type cannot be made prophetically.

I would counsel our younger members not to pay too much regard, in advance, to the question of reward for their inventions. Let them aim high and take long views; it is the *making* of the invention, the intellectual exhilaration and the sense of contributing to the trend of progress, that are the sure reward.

Elementary Principles

In all cases it is advisable to seek the advice and guidance of a good patent agent; the law and procedure are too intricate for the layman. An invention, to be the subject of valid letters patent, must be novel and useful, and it must offer "patentable subject matter." The first two of these stipulations are easily understood, but the third without further elucidation conveys no definite meaning to the mind. An alternative mode of expression is that the invention "must involve the exercise of the inventive faculty"; but this, while still being indefinite, is hardly appropriate to a large class of chemical inventions in which discovery is the prominent feature. There is, in fact, no more troublesome question in the whole range of patent law than that of subject matter, and by far the greatest number of disputes which have arisen in the past have centred round the issue of whether there was sufficient invention to support the patent. From the very nature of the subject, no satisfactory definition can be hoped for. The judge has to form the best opinion he can, in the light of the evidence before him, and it not infrequently happens that the three successive tribunals differ sharply in the conclusions at which they arrive, on the basis of the same set of facts.

"Inventive ingenuity" normally conveys the idea of something being evolved either intuitively or by deliberate reasoning from one's inner consciousness. We picture the inventor as excogitating some new sequence of operations, new mechanical device or the like, and afterwards verifying his conceptions by embodying them in actual plant, machines, and so on. Most mechanical inventions, and many chemical ones, originate in this manner. Chemistry, however, is distinguished from the mechanical sciences by the wide field which it offers for the discovery, as distinct from the excogitation, of new facts and processes capable of being usefully applied in manufacture. When a chemist, in the course of his experiments, stumbles across a new and quite unlooked-for compound, mixture, or reaction, which he sees to be of industrial value, it may be that the method of giving it practical application is self-evident, calling for no inventive ingenuity whatever. If, for example, the new observation is that on mixing two specified solutions a precipitate results, and the precipitate or filtrate therefrom, is thought to be useful, it is at once obvious that the discovery may be applied by mixing the solutions in tanks or other appropriate vessels and afterwards separating the precipitate from the liquid by decantation, filtration, or otherwise, the whole operation being such as is familiar to everyone.

Such processes, assuming them to be novel and useful, generally afford excellent subject-matter; and some of the most unassailable patents are for inventions of this nature. The inventive act here consists in making the discovery, appreciating its significance, and pointing to a method of applying it to practical, manufacturing purposes. The essential consideration is that the process, though *qua* manipulation a familiar thing in itself, is here applied to new substances or under new conditions (*e.g.* conditions of temperature, proportions, concentrations, or the like) to produce a new result.

Having made your invention, any competent patent agent possessed of adequate chemical knowledge may, provided he is supplied with all the requisite information, be relied upon to do what is necessary in the important work of drafting the specification. It is absolutely essential, however, that the frankest and fullest disclosure of all relevant facts be made to him. If you feel that you can also crystallise what you conceive to be your invention into a short statement, extending to only two or three lines in length and specifying all its essential features, you will assist him by formulating it in that way. It is of special importance, in the case of chemical inventions, to attend to the following points:

1. Try to ascertain, with scrupulous care, all the factors necessary for the successful performance of the invention, and, having done so, give in the specification full and clear information, illustrated by definite examples. I cannot too strongly press this counsel upon your consideration. A very large part of the costly litigation which has occurred in connexion with chemical patents in the past has been due to "insufficiency" of this sort. I am happy to say that, so far as my experience goes, such faults are almost unknown in the specifications of British inventors. No doubt the defect, when it occurs, is to some extent due to the differences which exist in the requirements of the patent laws of different countries; but whatever the cause, the defect is a serious one from our own standpoint. The bargain between the Crown and the patentee requires that the informed public—in this case, competent chemists, skilled in the particular art—shall be placed by the specification in full possession of all the knowledge requisite for successfully using the invention, and anything short of a full disclosure not only imperils the validity of the patent, but is obviously unfair to the public. A "full disclosure" does not mean a dissertation on the subject; but it is better to furnish your patent agent with a lengthy description, from which he may select the essentials, than to run any risk of failure in this respect.

2. Avoid the introduction of theory into your specification, unless the circumstances are very special and your patent agent considers it necessary—and in the latter case make plain that it *is* theory. The temptation to resort to theoretical conceptions in elucidating chemical inventions is sometimes very great; none but a chemist can appreciate how helpful, as a real, practical guide, chemical theory can be and generally is. Your invention, as formulated under the sagacious advice of your patent agent, may at first sight appear rather bare. You have been contemplating, perhaps, not only particular substances, but groups of whole classes of compounds; not reactions applicable only to a few, but general reactions such as your studies and experience have familiarised you with. Your patent agent sees, lurking in such broad ideas, the danger that the claims may extend to substances or to conditions of working which result in failure. There are cases, especially in the domain of organic chemistry, where it is almost impossible to avoid theory; it is then all the more necessary to seek the aid of a patent agent who has an adequate knowledge of chemistry to guide you.

3. Do not overstate what the invention can accomplish. Nearly all inventors are enthusiasts, who do not relish seeing their inventions stated in modest terms. Now, if an invention consists in a process or apparatus, it is plain that no laudatory expressions can assist in describing that process or apparatus. Commonly it is an advantage to indicate what the object of the invention is; sometimes, but more rarely, it is advantageous to indicate what the invention is claimed in fact to achieve. Any such expressions, however, should be inserted only with the concurrence of your patent agent.

Foreign Patents

The foregoing remarks refer to British patents. The various patent laws throughout the Empire do not differ greatly from our own, but in foreign countries the diversity, both of laws and practice, is so great that the guidance of a competent patent agent is at all stages necessary in the pursuit of applications there. The experiences of the patentee, who proceeds to protect his invention in a number of industrial countries abroad, are by no means always agreeable, and it is sometimes difficult to understand what principle underlies the objections raised by the examiners.

I would here venture to give expression to an earnest appeal to the Dutch Patent Office in particular, in the hope that it may reach those in authority there, to bring their attitude towards the would-be patentee more into line with that of other enlightened countries. From various quarters in this and other countries complaints are frequently heard of the difficulties, apparently unreasonable, which applicants encounter at The Hague. It is to be feared that the deterrent effect will in the long run operate to the disadvantage of Holland, since capital cannot be attracted to industries, and especially new industries, if inventors are unable to secure patent protection as readily as in other manufacturing communities.

From time to time proposals have been made to institute "world patents." The project, even if desirable, appears to me quite impracticable. The various patent systems are so different in form and underlying conceptions, and are so deeply woven into the legal and industrial fabrics of the various countries, that it is out of the question to reduce them to a common pattern. Possibly something may be accomplished towards the establishment of Empire patents, but even here the difficulties seem formidable, and they tend to become more so as time goes on.

Institution of Petroleum Technologists

THE Institution of Petroleum Technologists held their fourth annual dinner on Tuesday at the Connaught Rooms, London. Professor J. S. S. Brame (the president), was in the chair, and the company included: Mr. A. A. Ashworth, Mr. H. Barringer, Sir Frederick W. Black, Sir Reginald Blankenberg, Mr. R. P. Brousson, Mr. S. J. Butler, Sir John Cadman, Mr. Andrew Campbell, Lieut.-General Sir T. E. Clarke, Mr. A. Frank Dabell, Mr. Charles Dabell, Dr. A. E. Dunstan, Mr. Eric. J. Dunstan, Mr. A. Lloyd Eastlake, Mr. Arthur W. Eastlake, Sir Harry S. Foster, Sir Philip Lloyd-Greame, Mr. Lewis, B. I. Hamilton, Major John C. Hartley, Dr. H. S. Hele-Shaw, Dr. J. A. L. Henderson, Professor J. W. Hinchley, Sir Thomas H. Holland, Dr. C. Baring Horwood, Mr. Campbell M. Hunter, Commander F. G. L. Johnson, Major J. A. Lautier, Professor T. G. Madgwick, Mr. Charles E. Musgrave, Mr. H. E. Nichols, Mr. Maurice A. Ockenden, Dr. W. R. Ormandy, Engineer-Commander W. T. Parez, Dr. F. Mollwo Perkin, Sir Joseph Petavel, Sir William Plender, Mr. Francis Powell, Sir Robert Robertson, F.R.S., Paymaster Captain Shearme, Dr. Percy E. Spielmann, Commander R. E. Stokes-Rees, Dr. H. P. Straus, Lieut.-Colonel R. D. Temple, Admiral Sir Frederick Tudor, Mr. R. R. Tweed, and Mr. J. Wilkie-Frye.

Sir Philip Lloyd-Greame said that no industry in the world had made such progress in the past decade as had the oil industry. In 1913 the world's production of oil was something like 51,000,000 tons, Last year that production was 110,000,000 tons. Great as had been the expansion of the industry, he had no doubt that there would be far greater developments. Although it was not probable that any very great proportion of that development would take place actually in the territory of the British Empire, he had no doubt that the industry would draw more and more for its brains and its *personnel* on the young men of the rising generation of this country. No company, whatever its nationality, could do better than draw upon the young men who were now being trained in the oil industry in this country.

Grants for Mining Research

THE Mines Department announces that the committee appointed to allocate the fund constituted under Sec. 20 of the Mining Industry Act, 1920, held a meeting on February 28, under the chairmanship of Lord Chelmsford, at which the first allocations of money from the fund were made. Among the grants voted were £12,000 for research work on miners' safety lamps, both flame and electric, and coal dust dangers; and £1,000 for research on the control of atmospheric conditions in deep and hot mines. This research will be carried on under the supervision of the Department. A grant of £3,000 was made towards the provision of additional lecture-room and laboratory accommodation at the Nuneaton County Mining School.

The Society of Dyers and Colourists

New Results Disclosed to the Manchester Section

A MEETING of the Manchester Section of Dyers and Colourists was held on Friday, March 17. Professor E. Knecht presided. Two papers were read and discussed. The first was on "Some Observations on the Behaviour of Oxidised Cellulose," by Professor E. Knecht and Mr. F. P. Thompson, and the second on "A New Protective Agent for Animal Fibres," by Mr. Alfred Edge. There was a very large attendance of members.

Observations on the Behaviour of Oxidised Cellulose

Professor Knecht said that a method of determining the extent to which cellulose had been modified by oxidation or hydrolysis was described by Schwalbe in 1907. The cellulose product was boiled under standard conditions with an alkaline solution of copper sulphate and the amount of copper reduced had been termed the copper number of the product. Pure cellulose was without reducing action, but oxidised with hydrolysed cellulose, together with certain esters, it produced certain quantities of copper. In the more recent accounts of investigation of cellulose the copper numbers of the products were recorded. The actual numbers were of little importance, the chief significance being that the higher the copper number the further was the product removed from pure cellulose.

The copper numbers of oxidised cellulose prepared by the various oxidising agents or processes varied considerably. This was, no doubt, due to the different conditions and variations in the extent to which oxidation had taken place. By the use of potassium permanganate in dilute acid solution, for the oxidation of cellulose, as described by the secretary and himself in 1920, products could be obtained the degrees of oxidation of which were known by the amount of oxidising agent employed. This process had now been used to prepare a series of products not varying the known degree of oxidation, and the copper values were ascertained in each case for the purpose of discovering whether any simple relation existed between them and the amount of oxidant used in their preparation. Well-bleached cotton yarn was used as the most convenient form of cellulose throughout the investigation, and the oxidation products were prepared by the use of permanganate to apply from $\frac{1}{16}$th to 1. atomic proportion of oxygen per cellulose molecule counted on the $C_6H_{10}O_5$ unit. Weighed amounts of yarn were suspended in cold sulphuric acid of 10° Tw., and to this was added the calculated amount of permanganate as concentrated solution, also in 10° Tw. sulphuric acid, so that no dilution ensued. The yarn was turned periodically in order to obtain an even result. The series was allowed to stand until oxidation was complete in every case, which required about ten hours. A blank experiment was carried out without the addition of oxidising agent. There was always a small deposit of manganese dioxide on the fibre during permanganate oxidations. In the previous investigation this deposit had been estimated to amount to not more than 5 per cent. of the total amount of permanganate employed, so that it was almost a negligible quantity. The products were finally decolourised with hydrogen peroxide and well washed and dried at a temperature not exceeding 30°C. A number of tables were exhibited showing the results of the experiments in detail and giving exact data as to proportions.

In concluding, Professor Knecht said that in the initial stages of oxidation of cellulose by permanganate in cold acid solution the rise in copper number was nearly proportional to the amount of oxidant used up. After the use of half the atomic proportion the rise in copper number was very gradual. The acetylation of oxidised cellulose was not found to give any indication of the effect of oxidation on the hydroxyl groups of cellulose, which was due to the very great reduction in the yield. Highly oxidised cellulose gave a high yield of water soluble products on acetylation. When nitrated under identical conditions oxidised cellulose gave products containing considerably less nitrogen than cellulose. It was inferred that oxidation resulted in the suppression of the hydroxyl activity. Under the conditions which cellulose gave, labile mono-nitrate oxidised cellulose produced considerable quantities of nitric acid.

An Interesting Isolation

Before proceeding to the discussion of the paper, Professor Knecht announced that, in collaboration with Mr. C. A. Hatton, he had recently succeeded in isolating the nitrogenous cell content of the bleached cotton fibre. That something of the kind was present they had already known from experiments which were carried out by Dr. Schindler, in his (Professor Knecht's) laboratory about twelve years ago. From the results of the nitrogen estimations it was concluded that the amount of albuminoid contained in the cotton fibre would be about 1.3 per cent. They had now isolated the albuminoid and it amounted to 1.2 per cent. It was an interesting substance, and further research work was being undertaken, the results of which it was hoped to report at a subsequent meeting.

Mr. J. Hannay, in proposing a vote of thanks to the authors, said that the chief difficulty of those who were interested in cellulose and its varied uses was to keep abreast with the steady advance of the research work which was being done. He hoped that before long some work would be published including all the information which had been so laboriously gleaned. It was very interesting to be reminded that Professor Knecht had called attention to the ketonic action of cellulose, years previously, in view of the fact that a short note had been read at a recent meeting of the Manchester Section of the Society of Chemical Industry by Mr. Huebner, who had ascertained that ketones were discoverable in water over which a portion of bleached cotton had merely been suspended for a certain number of hours. What the actual bearing of this discovery might prove to be upon works practice it was too soon to say. Such research work, however, was bound to enlighten them all as to the manner in which OH groups were attached to the carbon-cellulose atom and was bound ultimately to have the greatest importance in regard to the practical application of cotton to cellulose in different forms of industry.

Mr. William Thomson, in seconding the vote of thanks, observed that the peculiarity that oxidised fibre gave a different amount of nitration from that obtained from the actual cotton without being oxidised was exceedingly interesting. The sample enclosed in a small bottle exhibited contained what was practically albumen. Perhaps it was possible to extract from cotton a product which was equivalent to egg? The product shown did not appear very appetising, but possibly if it were bleached it might be compounded into an exceedingly interesting food.

Mr. William Marshall said that everyone seemed to fight shy of the constitutional formula of cellulose. Some years ago he had done some work on the acetylation of cellulose with the idea of keeping the fibre intact and not producing a solution. He found that mercerised cotton for some considerable time would not acetylate at all. There seemed to be a prevalent idea that the constitution was not very much altered from the chemical point of view. He, however, believed it was. The acetylation would start all right with the ordinary pure bleached cellulose. He had about twenty experiments going on at once, the periods extending from one hour to twenty, and eventually the mercerised cellulose would overtake the other, so far as the acetylation was concerned, but it also became so tender that it could be powdered. It was a matter for inquiry as to whether mercerisation altered the molecule. He followed up the matter time after time and always obtained the same result. The field of investigation thus opened up was a very wide one.

Professor Knecht, in replying, said he was pleased to find it was considered that Mr. Thompson and himself had been able to make a little step forward in the study of oxidised cellulose. Apparently they would have to get the structure of cellulose built up by very little stages. He was very much interested in Mr. Marshall's statement respecting the tendering of mercerised cotton, though he was unable to offer any explanation of the phenomenon. He was also not going to attempt to give a constitutional formula of cellulose.

"A New Protective Agent for Animal Fibres"

Mr. Alfred Edge, in his paper, said that the action of alkali upon wool, unless special care was paid to the strength of the alkaline liquors and the temperature at which the material was treated, was known to be very deleterious. If the treatment was too severe the fibre might be completely destroyed. Between the wool fibre in its original condition, with its natural strength and lustre unimpaired, and the point of actual destruction there was a wide range of effect in which the durable qualities of the wool were more or less impaired and its wearing qualities deteriorated. Having regard to the

fact that a cleansing process with alkaline liquors was an essential feature in the production of textures from wool fibre it was somewhat surprising that the information available was so little applied in actual practice. Another point to be considered was the serious effect of the liquors upon the skin of the workman. At some mills both fine and coarse quality wools were given exactly the same scouring treatment; at others, soap was used in hard water, and very seldom had the scourer any idea of the condition of the scouring bath. That important injury to the fibre was often caused in scouring was beyond question, and yet it was difficult to convince those responsible for the scouring operation that the process was worthy of careful and scientific investigation. So long as the wool was clean the object of the process was considered to be achieved. As to the effect of a too severe treatment during washing on the affinity of the fibre for dyes no definite information was, to his knowledge, available, but it was at least possible that some of the dyers' troubles were due to a too drastic scouring, while others were caused by an ineffective cleansing of the material. The Aktien Gesellschaft für Anilin, Fabrikation (Berlin) were now placing upon the market a product which they termed "Protectol." It was at present sold in the form of syrups which were readily soluble in water. The composition of the product could not be disclosed at present. The quantity to be used varied according to the quantity of alkali present. As a rule, half as much "Protectol" as soda ash was sufficient to afford protection from injury to the wool.

Mr. Edge then exhibited samples of wool which had been treated with "Protectol," and described its application to dark-coloured rags, union dyeing, woollen piece goods, &c. It was now possible, he said, rapidly and safely to de-gum silk in an alkaline bath without damage to the fibre and with a great saving of steam and labour. The method had been successfully adopted by some of the most important silk firms in the country. The dyeing of cotton with sulphide colours in mixed fabrics consisting of cotton and wool was also rendered possible.

A large number of inquiries respecting possible uses of the substance in the dyeing and textile trades were addressed to and answered by Mr. Edge.

Use of Rubber in Paper-making

In a description in the *Manchester Guardian Commercial* of his new process of applying rubber latex to paper-making, the inventor, Mr. Frederick Kaye, A.R.C.Sc., makes some interesting and remarkable claims for it. He points out that as a result of adding the latex to the pulp, the finished paper is strengthened to a remarkable degree, will not crack on folding, and becomes more pleasant to the touch. It is also found that the rubber has no deleterious effect upon the colour, or whiteness of the finished paper, while, as regards the saving of time in its preparation, the addition of the latex reduces the necessary "beating" of the pulp very considerably. Another advantage is that the paper, by the addition of rubber is made waterproof, and the inventor points out that this opens up a large field of possibilities in commercial enterprise; as does also the fact that by applying the rubber to a very strong fibre such as Manila hemp, jute, &c., products can be made on the paper-making machine to take the place of leather for many purposes. Such waterproof and imitation leather products will readily lend themselves to artistic design and manipulation.

The inventor states that practical commercial experiments have shown that the labour costs, &c., of the addition of rubber latex are negligible, and that the development of the process on a big commercial scale ought to actually lessen the production costs very considerably.

Funeral of Lord Manton

The funeral of Lord Manton took place on March 17 at Offchurch, near Leamington. The remains were conveyed from Compton Verney to the church on a farm lorry which was followed by over 100 estate employees. Mr. G. M. Watson (the new peer) was accompanied by his three brothers, and among others present were Mr. J. L. Ferguson (representing Lord Leverhulme and the directors of Lever Brothers, Ltd.), Mr. Charles R. Baker (chairman, Joseph Watson & Co., Leeds), and representatives from all the estates, including Dr. Crowther (principal, Agricultural Research Department).

Society of Chemical Industry

Annual Meeting of the Nottingham Section

The annual meeting of the Nottingham Section of the Society of Chemical Industry was held at the University College, Nottingham on March 15, Mr. J. H. Dunford presiding. In presenting the report for the year the hon. secretary (Mr. J. M. Wilkie) said the past year had been a most trying period for British chemical industry. Although the previous year's balance of cash in hand was £9 17s., the hon. treasurer reported that it was now £12 4s. 9d., which, together with the War Stock held, made the assets up to £83 9s. 5d. The following officers were elected for the ensuing year: Chairman, Mr. S. F. Burford; vice-chairmen, Messrs. J. H. Dunford and H. D. Pentecost; hon. secretary, Mr. J. M. Wilkie; and hon. treasurer, Mr. S. J. Pentecost.

The Action of Enzymes

Dr. E. F. Armstrong, F.R.S., then read a paper on "Enzyme Action in the Light of Modern Theories of Catalysis," in which he said that enzymes were substances of unknown composition and somewhat unstable when separated from the living cell. That they were probably colloidal sols was shown by their mode of preparation, their sensitivity to small external changes, and other evidence. Their effectiveness in catalysing reactions, chiefly hydrolyses, was partly due to their highly dispersed state. The lecturer then gave examples of the highly selective nature of their action and the relatively enormous effect of minute quantities as compared with acids in much larger quantities. In the hydrolysis of glucosides by enzymes the simple molecules of water or hydrone H O probably played a great part, the medium being rendered conducting by the residual saline impurities of the enzyme. The sulstrate combined chemically with the enzyme surface, and this compound was then decomposed with hydrolysis. The probability of a close chemical similarity between enzyme and its particular sulstrate was shown by the fact (Fischer) that only one out of thirty-two possible methyl glucosides was hydrolysed by maltase and emulsin.

The (enzyme) sulstrate was supposed to be attached to the surface of the enzyme not only by certain groups, as in the case of the layer of oleic acid on water (Langmuir), but along its whole length, owing to a close similarity of structure. The glucose produced was also able, apparently, to fit the enzyme surface, since the accumulation of glucose (but not similar quantities of sucrose, &c.) diminished the catalytic action.

The co-enzymes or zymogens, which, though inactive themselves, were necessary to the enzyme's action, might be the enzymes themselves in an inactive form. There was considerable evidence that the action of enzymes was suspended or released by the control of the living cell. Calcium salts stimulated the activity of pectase, and in other cases the removal of salts by a prolonged dialysis led to a loss of activity of the enzyme. Harden had shown that when zymase was filtered through gelatine the residue and filtrate were both inactive, but became active when mixed. The velocity of the reaction catalyst often remained constant for some time, and this was taken as evidence that the velocity measured was not one of diffusion but the velocity of decomposition of the surface compound of enzyme and sulstrate.

The Erection of "Tennant's Stalk"

Apropos the tragic ending to "Tennant's Stalk," referred to in The Chemical Age last week a correspondent of the *Glasgow Herald* recalls a remarkable incident associated with its erection. It appears that a time limit had been fixed for its completion, and the contractor, having finished the work some time before the appointed date, conceived and carried out the remarkable enterprise of conveying the public in chairs rigged up in the interior of the chimney to the top for a fee of 1s. per head.

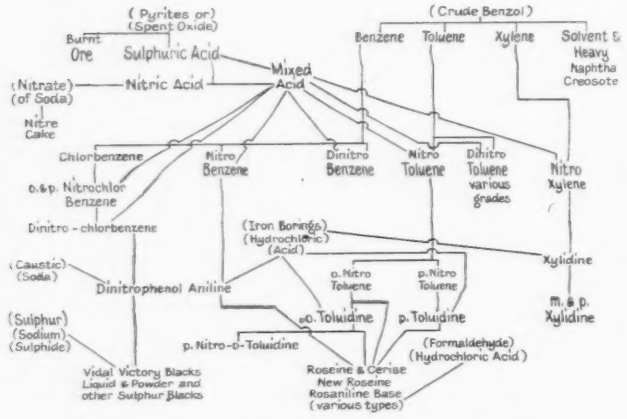
Society of Glass Technology

A meeting of the Society of Glass Technology was held in St. Thomas' Hall, Stourbridge on March 15, when the following papers were read and discussed: "Some Notes on the Production of Colourless Glass in Tank Furnaces," by A. Conser, and Professor W. E. S. Turner; "A Review of the Preliminary Specifications for Refractory Materials used in the Glass Industry," by W. J. Rees. During the morning parties visited the works of King Bros. (Stourbridge) Ltd., and E. J. & J. Pearson, Ltd. The date of the annual general meeting has been changed from April 12 to April 26.

British Intermediates and Dyestuffs

Developments at Hickson & Partners' Works

THE works of Hickson & Partners, Ltd., which were put up during the war for the manufacture of nitric and sulphuric acids, toluene and T.N.T., have since the termination of hostilities been reorganised and converted for the output of intermediate products of the benzene series and dyestuffs derived from them. The programme adopted throughout has been to follow the logical chemical sequence of operations, so that, with the exception of heavy chemicals, practically everything is produced from the elementary raw materials—*e.g.*, nitrate of soda, pyrites, or spent oxide and crude benzol. The flow sheet, as follows, explains this sequence in a simple manner :



The sulphuric acid plant is a lead chamber unit constructed according to the most modern Continental ideas. It is built entirely on steel girder framework. The chambers are of greater height than is usual in this country, being 10 metres high. The chamber space is about one-third of a million cubic feet, giving a possible production of 15,000 tons of brown oil of vitriol per annum. The bulk of this is sold for the production of sulphate of ammonia and superphosphate, though large quantities are used inside the works.

The nitration plant was put up during the war and improved from time to time, so that the firm now possess one of the most modern plants in the country. The immense experience gained during the war by the Ministry of Munitions on nitration processes has been freely at the disposal of the chemical and engineering staff at Castleford, and this experience is of great service in the production of the various nitro products shown in the chart above.

A reduction plant for the manufacture of monamines is the next in sequence, and this unit is at present working at full output, turning out aniline, toluidines, &c. Hickson & Partners have devoted much time and experiment to the attainment of the highest possible degree of purity. Distillation units have been erected both for fractionating and direct distillation under vacuum, and the purity of the nitro and amido products now manufactured is claimed to be equal to that of the best German articles.

Turning to the dyestuff side, the firm have secured the British patent rights of M. Vidal's latest Sulphur Blacks. After unavoidable delays in erection of suitable plant for these new processes, these blacks are now turned out and marketed for the home user in liquid form, ready for use under the title of "Vidal Victory Black Liquid," which works in without any further addition of sulphide. Various types ranging from a green shade of black almost identical with aniline black to a heavy red shade black are made. These products are also turned out along with common Sulphur Blacks in powder form.

A large magenta shed devoted exclusively to this colour is in operation. Various types of crystals and powder are sold under the original British name for this product, namely, "Roseine." Special attention has been devoted to the production of pure Para Rosaniline Base for the manufacture of the finest shades of soluble and alkali blue. Other quality Rosaniline bases of excellent purity are made for the medium and redder shades of blues.

The firm attach great importance to their research department, which is devoted exclusively to their future programme. They realise that this is a vital factor as regards their future welfare. Excellent results have already been obtained, and it is hoped that with the revival of trade a plant for the production of benzidine, tolidine, dianisidine, &c., will shortly be in operation.

Mr. Bernard Hickson, the technical director, was fortunate in being sent with the Department of Overseas Trade Mission in 1919 to visit the German colour works, and seeing at first hand the very efficient organisation and lay-out of the German works.

Synthesis of Allyl Alcohol

Possibilities of Successful Commercial Production

BEFORE the West Riding Section of the Society of Dyers and Colourists at Leeds, on March 16, some important disclosures were made with regard to wartime efforts to produce synthetic glycerine. The research work was undertaken by Mr. L. Guy Radcliffe and Captain Hugh G. Shatwell (Manchester College of Technology) at the instance and expense of the Food Investigation Board of the Department of Scientific and Industrial Research, and a complete success would have been of the greatest importance at that time from a food point of view. Allyl alcohol (from which glycerol is easily obtainable) was in fact produced, but only in small quantities, and the investigators have not since continued their researches.

Mr. Radcliffe, in reading his paper, said the work had been of a tedious nature, and they were hampered in the concluding stages by the difficulty in procuring calcium. The vital experiments were summarised as follows. A well-known reaction (Perkin) occurred when an aromatic aldehyde such as benzaldehyde was heated with the anhydride of a fatty acid in the presence of the sodium salt of the acid. The actual reaction was very complicated, but for practical purposes it could be represented as taking place thus :

$$C_6H_5.CHO + H_2CH.COOH = C_6H_5.CH + CH.COOH + H_2O.$$

The product was phenyl acrylic acid ; *i.e.*, cinnamic acid.

From the point of view of the investigations in hand, the interest lay in the fact that the alkyl group lost two hydrogen atoms, which combined with the oxygen atom of the aldehyde group. Although this reaction was well known and general, the possibility of causing a similar reaction to take place between an aromatic aldehyde and an aliphatic alcohol did not appear to have been accomplished. One of the authors, therefore, attempted the condensation of benzaldehyde and ethyl alcohol with the object of producing the important cinnamyl alcohol, thus :

$$C_6H_5.CHO + H_2CH.CH_2OH = C_6H_5.CH + CH.CH_2OH + H_2O.$$

This reaction was found to take place when the two main materials were heated together in the presence of such a substance as zinc chloride or ferric chloride or stannic chloride, but the yields were not good.

It was then thought that having shown the possibility of this reaction it might be that formaldehyde could be made to react with ethyl alcohol thus :

$$CH_2O + H_2CH.CH_2OH = CH_2 + CH.CH_2OH + H_2O.$$

This reaction was actually found to take place, and in the earlier experiments the ethyl alcohol was used in the form of sodium ethylate, but later calcium ethylate was used, and from the products of the interaction of various forms of paraformaldehyde and calcium ethylate small quantities of allyl alcohol were obtained, and it was thought that by this means allyl alcohol could be made in quantity. The importance lay in the fact that this alcohol, by oxidation with aqueous permanganate of potash, could be made to yield glycerol. They had not continued their investigations, but they believed that along these lines the production of allyl alcohol on a commercial scale could be achieved.

The Chairman (Mr. F. Smith) said it was an important step towards this end, and in the future the missing link might be discovered which would make it a commercial proposition. When that took place, he hoped the two investigators would receive their due share of credit. There was no doubt that there was a big field for such a process, and Germany would have been glad to pay heavily during the war for the information which had been gained by Messrs. Radcliffe and Shatwell.

Early Victorian Economics

Bringing the Science Up to Date

By Ernest J. P. Benn

SINCE the war everybody is talking of economics, and the interest in the dry-as-dust science has spread to every part of the community. But, notwithstanding a public awakening unequalled in history, a practical experience in the workings of economic law unparalleled in the annals of mankind, and a flood of literature which defies the efforts of the most determined student to keep pace with it, very little has been done to test the adequacy of economic science so far enunciated, or to inquire how far it really bears upon the activities and the well-being of modern man. Politicians, industrial leaders, and students of economic questions generally have, under war pressure, rushed at the writings of the mid-Victorian era, and accepted the sayings of Adam Smith, Karl Marx, and their contemporaries, almost as if they were revealed truth, and based their arguments and actions upon them almost without further inquiry.

But surely a science of economics which was formulated before the days of electricity may be as faulty and as useless as a science of medicine which overlooked the discovery of the circulation of the blood. Karl Marx told us that wealth arises from land and labour. Sidney Webb has widened the meaning of the term "labour" to include forms of toil which do not soil the hands, and that is really about as far as many of us have got in the science of economics. It is indeed questionable whether we have begun on economics, properly so called, at all, and whether such thoughts as we employ in this direction would not be more correctly described as Sidney Webbics. So little has the science of economics advanced with the times and taken cognisance of human development, that Professor Ramsey Muir is at this moment busy saying in the language of 1920 almost exactly what Karl Marx said in 1860, and Sidney Webb in 1890.

England is becoming a mass of Socialism, and unless we realise that fact the present process of universal limitation will continue, the standard of living will get lower and lower, and the glorious era of wealth production, which is really England's contribution to humanity, may be said to be drawing to a close. Socialism so thoroughly permeates the English mind that it influences the action of the Tories almost as much as the Communists. The great majority of us still look upon wealth as a fixed quantity; we still think it possible to benefit one person by robbing another; we have never been able to overcome our prejudice against success, and we still formulate our taxation on the lines of making the punishment fit the crime, believing that the wealthy man is an enemy of society, and that his suppression is a desirable aim.

The modern politician and the man in the street paint for themselves a very simple picture of industry. It is the picture which was drawn by Karl Marx, and nothing is more surprising than the way in which its outlines are accepted, even by those who declare most vehemently their opposition to the Marxian doctrine. Three or four sentences will describe it. "A grasping, avaricious, scheming individual, called an employer or a capitalist, gets control of a worthy creature called a workman. From that partnership there arises a profit—there is always a profit—and that is an intolerable condition of affairs which is the bounden duty of Parliament to amend." If modern industrial legislation is sifted to the bottom, this picture will always appear as the original inspiration for the action taken. But is the picture true? Does it bear any relation to the fact? Obviously not. There is a very simple way in which we can all get our thoughts right on this vexed question of industry and economics. If we will look round us and select some common article of ordinary use, and devote thirty seconds to thinking about it, to inquiring whence it comes, what it is, of what it is made, and how it reaches us, we can very rapidly get a true conception of the complications of the problem about which we are so ready to express convinced opinions and definite views. Suppose we take as an illustration a common collar, and give our minds to it for half a minute. It was bought, shall we say, in the Strand, London, for 1s.; it was made in Leicester or Nottingham, with machinery which came, some of it from America, some from Germany, and parts from Scotland; it is composed of Irish linen, put together in Belfast, from flax grown in Russia. Already our minds have wandered over half the globe, and we have been brought face to face with the problems of iron, coal, steel, railways, shipping, transport, and, most complicated and wonderful of them all, credit, banking, and finance. When we pause further to realise that in some miraculous way a portion of the shilling which we paid in the Strand for the collar we are considering operated to provide the peasant in Russia who reaped the flax of which the collar is made with a cup of tea from China or a cigarette from Cuba, we begin to get an elementary notion of this thing called industry about which we are all so ready to express views and opinions. A little further consideration of the question of the collar, and we find ourselves wondering what, after all, labour and capital have to do with it. The peasant in Russia may reap flax till doomsday and nothing would happen; the railway worker at Belfast might wheel bales of linen about for a thousand years, and again nothing would happen; the capital represented by the machinery at Nottingham or Leicester would merely rust until nothing but dust remained if it relied alone upon what is so weirdly described as Labour. We are left, it seems, wondering whether we really do understand this industrial question, and whether the capital and the labour, in whose interest so much breath and ink have been expended, are, after all, as important as we have been led to believe, and whether either of them by themselves, or both of them in co-operation, could produce wealth as we know it to-day, or could keep the swollen populations of the twentieth century in being at all. It dawns on us by degrees that neither Adam Smith nor Karl Marx ever dreamed of a 1s. collar. There is certainly no doubt that to Karl Marx the collar was the sign of the capitalist and a thing to be abolished.

No. We must start again; and there could not be a better time to start. From the highest to the lowest, we of this generation possess a practical experience of the workings of economic law which surpasses in completeness that of any previous generation, and we are, therefore, equipped and fitted to construct a new science of economics which shall sweep away all the follies of the past, and which will place at the service of those who come after us a true understanding of the nature of wealth, enabling mankind to acquire and maintain a higher standard of living than has ever before been possible.

The first big fact which must be accepted from the housetops and written in capital letters in the front of our minds is that we live by exchange. If only we would digest that one big truth we should be able to get the others into true perspective. Capital and labour would cease to occupy the whole of the stage as they have hitherto done, and we should realise that the prime factor in the creation of wealth is neither capital nor labour, but exchange. The war has given us our first real chance to grasp and understand this. Commodities are not in themselves wealth. They may be the raw materials of wealth, but they only become the real thing when they are exchanged.

We talk of the laws of supply and demand, but we forget that both supply and demand require making, and demand often requires more making than supply. The man who can bring supply and demand together is performing a higher function than he who can make supply, or he who possesses demand. A little thought along these lines exposes the folly of all the rubbish that is talked about middlemen, parasites, and profiteers, and leaves us to question most of the things that we have done in recent years in an effort to extinguish these persons.

The new economics, which cannot now be long delayed, will classify us in a more scientific manner and correct our sense of proportion. Instead of a Labour Party we shall have an Exchange Party, into which will congregate all the people who really carry the bulk of the responsibility for wealth creation. The Exchange Party membership will consist of merchants, shopkeepers, travellers, salesmen, advertisers, and demand-creators generally. It will embrace all those brains which Mr. Sidney Webb has made such frantic efforts to secure for Labour. Everyone who is engaged in doing anything to facilitate exchange, which means everyone who takes an interest in his job and really does his duty, will be an enthusiastic member of the Exchange Party. Behind this front rank of the industrial army will range themselves side by side the old-fashioned Capital and Labour, each recognising that they are necessary but subsidiary functionaries.

In some such way as this we shall be able to support our populations in ever-increasing comfort, and provide for larger populations yet to come, but unless we do take some such steps, unless we learn in time the lesson of Russia, then we shall assuredly have to face a steady reduction in the standard of living and the corresponding necessary reduction in the numbers of the human race.

Chemical Matters in Parliament

Revenue from Safeguarding Act

Answering a question by Mr. A. Herbert (House of Commons, March 15), Mr. Young said that the net amount of duty received under the Safeguarding of Industries Act during the last three months was £73,200.

Gretna Factory

In reply to Mr. G. Locker-Lampson (House of Commons, March 15), Mr. Young said no work was being now carried out at Gretna beyond the destruction of dangerous buildings and the preparation of assets for sale.

Volume of Import Trade

Mr. Kiley (House of Commons, March 13) asked the President of the Board of Trade whether, before setting up any more committees under Part II. of the Safeguarding of Industries Act, he would carefully consider the Board of Trade returns for the year 1921, which show a reduction of 50 per cent. in our total imports for that year and the Board of Trade returns for the months of January and February, 1922, which show a further decline against those of the year 1921.

Mr. Baldwin said he was unable to accept the figures as stated. Though it was true that the money values of imports as shown in the trade accounts were much below those recorded a year ago, the volume of trade in recent months had shown little, if any, falling off from that of a year earlier.

Sale of Explosives

Mr. F. Roberts (House of Commons, March 14) asked the Financial Secretary to the Treasury whether, in connexion with the sale of explosives, any inquiries were made by the Disposals Board as to the purchasers having suitable premises or as to their being able to make satisfactory arrangements for the safe handling of the materials.

Mr. Young said that where the purchaser was not known to be authorised to break down or had no previous experience, inquiries were made, and the contractor was warned he must satisfy the Home Office and obtain a licence from them before he could break down ammunition.

Imports of Alizarine Colours

Mr. Kiley (House of Commons, March 15) asked the President of the Board of Trade if he had received a communication from Thomas H. Daniels, of Belfast, complaining of the refusal of the Dyestuffs Advisory Committee to allow him to import alizarine cyanole violet R. and alizarine brilliant green S.E. powder, the latter of which he stated he could import for 16s. per lb., whereas he was referred to a British firm whose price was 30s. for the same colours but with half the strength. If this complaint was found to be correct, would he give instructions to the Dyestuffs Advisory Committee to issue the necessary permit.

Sir P. Lloyd-Greame said he had received a communication from the firm mentioned, who, as he understood, were agents for a German dye-making company. Of the applications in question, the first was refused by the Dyestuffs Advisory Licensing Committee on the ground that a satisfactory British equivalent for the dyestuff mentioned was available.

The applicant then raised the question of the difference in price, and was informed that applications based on that ground could be entertained only when made by the actual consumer. As regards the second case, the question of price difference was not raised by the applicant, who, in fact, quoted in his application to the committee the German price as 36s. a lb., and not 16s., as stated by Mr. Kiley. He was not prepared to override the action of the Advisory Committee in this matter.

Anglo-Persian Oil Co.

A Bill intituled the Anglo-Persian Oil Company (Payment of Calls) Bill, "to provide money for the payment of calls on share capital in the Anglo-Persian Oil Co., Ltd., acquired under the Anglo-Persian Oil Company (Acquisition of Capital) Amendment Act, 1919, and to amend the law with respect to the application of dividends or interest on capital held in the said company," was read for the first time in the House of Commons on March 15.

Price of Superphosphate

In reply to Mr. James Walton (House of Commons, March 15), Major Barnston said the statistics and market prices collected by the Ministry of Agriculture during February showed that the price of superphosphate was about 70 per cent. above the average of the three years 1911-13. He understood that representations had been made to the Board of Trade regarding the application of Part II. of the Safeguarding of Industries Act, but no *primâ facie* case for reference to a committee had been established.

Sales of Reparation Dyes

Answering Major Barnes (House of Commons, March 20), Mr. Baldwin said the value of German reparation dyes handed over for sale by the Central Importing Agency during the six months ended September 30, 1921, as fixed with the German authorities, was 12,297,000 paper marks. He was unable to state what these particular dyes realised or the cost of realisation, but accounts as at March 31, 1922, would be prepared in the ordinary course and these would be available later. The amount credited to the German Reparation Funds was the delivered value of the dyes. He understood that the Central Importing Agency had derived no profit from handling these dyes.

Replying to another question by Major Wood, Mr. Baldwin said the estimated value of German reparation dyes handed over for sale to the Central Importing Agency for the twelve months ended December 31, 1921, was £75,000. A commission of 3½ per cent. on realisations, which included charges for freight, storage, and distribution, was paid to the agency.

British Industries Fair

Replying to Mr. Gilbert (House of Commons, March 20), Sir P. Lloyd-Greame said the total cost of the London Section of the British Industries Fair was approximately £35,000. The cost was covered by the payments made by the exhibitors, and the Fair involved no charge on public funds. Taking into consideration the present trade conditions, the Fair was considered by the Department of Overseas Trade to have been an unquestioned success. The total number of visitors to the Fair, exclusive of re-admissions, amounted to 49,998. A considerable volume of business was transacted, but it was impossible to give even an approximate figure, as firms did not make any return of orders booked, and further, it had been found by experience that a large proportion of the orders secured by exhibitors were not actually placed until after the close of the Fair. There could be no doubt from the statements made by exhibitors that the Fair had stimulated their trade.

Importation of Lime Green

In reply to Lieut.-Commander Kenworthy (House of Common, March 20), who again drew attention to the difficulty experienced by colour and paint manufacturers owing to the obstacles placed in the way of obtaining supplies of lime green from abroad, Mr. Baldwin said he had nothing to add to his statement of March 6 (*see* THE CHEMICAL AGE, March 11, p. 316). The technical committee which investigated the matter was quite satisfied that there was no serious ground for complaint.

Decisions of the Dyestuffs Advisory Committee

Replying to questions by Major M. Wood and Mr. Kiley (House of Commons, March 20), who both suggested the inauguration of some sort of appeal from the decisions of the Dyestuffs Advisory (Licensing) Committee, Mr. Baldwin said he was quite satisfied with regard to the competence and impartiality of the committee, and he was quite sure that if there were a general desire for such a court of appeal he would have many representations made to him direct from the trade. He had not yet had such representations.

Dyestuffs Act Committees

In reply to Major M. Wood (House of Commons, March 20), Mr. Baldwin said no salaries or allowances were paid to members of either of the committees set up under sec. 2 (3) and sec. 2 (6) of the Dyestuffs (Import Regulations) Act, 1920. The Licensing Committee had held thirty-six meetings and the Development Committee five meetings, and in both cases practically all the members had attended regularly. A quorum for the Licensing Committee consisted of one independent member, one dye-making representative and two consumer representatives. No quorum had been fixed for the Development Committee.

Catalogues Received

Products manufactured at their Pioneer Chemical Works, Stratford, London, are described in the 1922 booklet of Frederick Boehm, Ltd., of 15-17, Jewry Street, London. Considerable space is devoted to catalytic driers for oil, paint, and varnish manufacture. The resinates are dry solid products and the linoleates vary from semi-liquid to soft or hard pastes, according to the nature of the metal. Liquid driers, varnish gums, "Murol," paste varnishes, stand oils, prepared wood oil, raw China wood oil, &c., are among the other products described.

Exhausting machinery and accessories are dealt with in the new catalogue of George Waller & Son, Ltd., Phœnix Works, Stroud, Gloucestershire. A most comprehensive list as regards this particular class of machinery, it contains a large number of illustrations of various types of plant. The firm, it is interesting to note, were responsible for the introduction of the three- and, later, the four-blade rotary exhauster. Some helpful "Notes on Exhausting Machinery" are included, together with a long list of some of the works where the firm's exhausters have been installed.

The revised price list issued by the Victory Pipe Joint Co., Ltd., of 28, Victoria Street, London, gives in a handy form the dimensions, prices, and code words for the "A" and "B" type "Victaulic" pipe joints. These joints are made for pipes from ¾ in. up to 72 in. in diameter, and for pressures up to 10,000 lb. per sq. in. The joints shown in the list are described as being suitable for a hydraulic test pressure of 600 lb. per sq. in., working pressures of 300 lb. per sq. in. for water or oil, and working pressures of 150 lb. per sq. in. for compressed air. The company have made arrangements with a number of British tube manufacturers for the supply of tubes with ends to suit the "B" type "Victaulic" joint, and the majority of these firms are prepared to quote for pipe lines complete with these joints. Readers of THE CHEMICAL AGE may obtain the catalogue free on application to the manufacturers.

A comprehensive review of the products of Nobel Industries, Ltd., is contained in a booklet of this title. The names of the companies forming the amalgamation, together with aerial photographs of the factories, are given, and explanatory notes concerning the products of the amalgamated concerns give some idea of the extensive interests of the company. In addition to the manufacture of explosives of all kinds, an important branch of the company's work consists of the manufacture of industrial collodions for various trades. The chemical section embraces such products as arsenite of soda, calcium chloride, caustic soda, 70/72 per cent., collodion and solutions thereof, ground sulphur, hydrochloric acid, mesothorium, methylated ether, thorium nitrate, cerium compounds, lead nitrate and sulphate, nitric and sulphuric acids, white lead, &c. Copies of the booklet may be obtained on application to the company at Nobel House, Buckingham Gate, London.

A handsomely bound booklet giving a list of branches and agents in the British Isles and overseas, and detailed lists of the colours and intermediates now being produced, was prepared by the British Dyestuffs Corporation, Ltd., of 70, Spring Gardens, Manchester, for distribution to buyers at the recent British Industries Fair. Their range includes all shades of direct cotton, acid, sulphur, union, basic, chrome and mordant, vat, oil, spirit and wax, and lake colours, fur bases, specialities for leather, intermediates, and pharmaceutical and photographic fine chemicals. A pamphlet issued at the same time describes the part played by the dyestuffs industry in Empire defence, and shows its uses in offence and defence.

The British Mills Foundry (Incandescent Heat Co., Ltd., of Cornwall Road, Smethwick, Birmingham), explain in Booklet No. 18 the main facts and principles underlying the process of malleable casting production as carried out at their works. It is also intended to serve as a guide to users of this class of material by supplying reliable information concerning the properties and advantages of such castings. A number of micro-photographs of ordinary cast iron, mild steel, &c., are given, together with illustrations of malleable iron castings of various shapes and sizes.

A booklet issued by Griffiths Brothers & Co. (London), Ltd., Macks Road, Bermondsey, London, deals with insulating varnishes and compounds and their practical application. In order to meet the many different demands upon insulating materials the manufacturers have made a number of different grades suitable for various uses, many of which are indicated in the brochure.

A. Gallenkamp & Co., Ltd., of 19-21, Sun Street, Finsbury Square, London, have enlarged and revised their list No. 75a dealing with electric laboratory furnaces. The Gallenkamp furnaces, which are patented, have been specially designed for laboratory and small industrial heating. The catalogue contains two interesting time and temperature charts sent to the firm by a user of their furnaces. The maximum temperature of these furnaces is 1,000°C., the time taken in heating up varying from 30 to 60 minutes, according to the size of the heating chamber. Several new furnaces are described and illustrated, and the general descriptive matter has been considerably extended.

The Vange Water Co., Ltd., forward a copy of an analysis of Vange water, a natural British aperient water, which is bottled under the control of Dr. S. Rideal. This water has been analysed periodically for over twenty years, and the first analysis in October, 1900, and the last on November 28, 1921, show that it has not lost any of its constituents and mineral properties. Dr. Rideal's latest analysis gives the following results (parts per 100,000) :—Magnesia (MgO), 203.8 ; lime (CaO), 62.2 ; soda (Na_2O), 69.4 ; potash (K_2O), 14.2 ; manganese oxide (MnO), .011 ; sulphuric anhydride (SO_3), 527.7 ; chlorine (Cl), 43.5 ; carbonic acid (CO_2), 23.8 ; silica (SiO_2), 2.65 ; The above acids and bases are probably combined, as follows :—Magnesium sulphate ($MgSO_4$) 611.4 ; calcium sulphate ($CaSO_4$), 77.5 ; calcium carbonate ($CaCO_3$), 54.1 ; sodium chloride (NaCl), 71.8 ; sodium sulphate (Na_2SO_4), 110.9 ; potassium sulphate (K_2SO_4), 26.2 ; manganese carbonate ($MnCO_3$), .017 ; silica (SiO_2), 2.65. The total amount of these salts is 954.6 parts per 100,000, and the volatile matter, being found to be 125.8 parts, makes the total solid matter 1,080.4. The water contains no arsenic lead, tin, or other poisonous metals, and nitrates and nitrites are absent. The water contains free ammonia, .0412 parts ; albuminoid ammonia, .0156 parts ; the oxygen consumed being .156 parts.

The illustrated catalogue of Fuller's United Electric Works, Ltd., gives particulars of their ebonite rod sheet, tube, and moulding for accumulator, chemical, electrical, motor, and telephone trades, and general commercial work. The use of ebonite is extending in several industries, and Fuller's are understood to be doing a considerable business in the lining of pans and other equipment for chemical works. An interesting example of the high condition to which ebonite has been brought is furnished by the firm's desk calendar, a particularly neat contrivance worked in ebonite and aluminium.

The advantages of machine firing are convincingly set out in a brochure on "Mechanical Stokers," issued by Meldrums, Ltd., of Timperley, near Manchester. It states that the Meldrum stoker was the first machine upon which the steam jet forced draught was used, and describes the types now being manufactured. These comprise the coking and sprinkler stokers, with or without forced draught. The latter is supplied in three different forms—*i.e.*, moving, fixed, and rocking grate. In addition to illustrations of various types of stokers, front and side elevations are given of coal elevators as applied to a Lancashire type boiler.

Illustrations of a number of large iron castings made at their works at Garston, Liverpool, figure prominently in the latest catalogue of Francis Morton & Co., Ltd. These include cast-iron acid retorts, geared mixing vessels with steel jackets, cast-iron covers for acid retorts, and cast-iron nitrating pots.

Standardisation of U.S.A. Dyestuffs

IT is reported that the American Department of Commerce Appropriation Bill provides for the development of colour standards with reference to their use in standardisation dyestuffs, inks, and pigments, by the Bureau of Standards. Dr. S. U. Stratton, director of the Bureau of Standards, discussing the item for colour standards and measurements, before the Committee on Appropriations, compared American and German dyes.

Asked whether American dyes were as good as German, he said they were in many cases, and that there was no reason why they should not be so in all cases ; but added that there was a good deal of competition going on which called for standardisation among American manufacturers, together with a definition of standards, and instruction in the standard preparation of dyes, so that the man who proposed buying them for dyeing textiles might know that he was getting the right thing.

From Week to Week

It is reported that the Swiss State monopoly of BLUE VITRIOL will probably be abolished in the near future.

Built at Montrose, the ss. *Manxsona*, has been handed over to the owners, the MANX SALT AND ALKALI CO., Isle of Man.

RHODES & CO., chemical importers and exporters, announce that their offices are now at 44, Whitehall Street, New York.

Several milk dealers were fined at the North London Police Court on March 17, forselling milk to which ANNATO had been added.

CAPTAIN V. T. PALMER, of Palmer & Co., Ltd., soap manufacturers, Stratford, London, has been re-elected to the Kent County Council.

E. G. ACHESON, LTD., late of 5, Chancery Lane, London, announce the removal of their London office to 40, Wood Street, Westminster.

At the invitation of the French Society of Physics, Dr. Einstein is visiting Paris to deliver a series of six lectures on his THEORIES OF RELATIVITY.

A translation of the new PERUVIAN PETROLEUM LAW may be inspected on application to the Department of Overseas Trade, 35, Old Queen Street, London.

THOMSON, SKINNER, & HAMILTON, chemical merchants, of 38, Sauchiehall Street, Glasgow, have been elected members of the Glasgow Chamber of Commerce.

A new NICKEL SILVER ALLOY which is claimed to be equal if not superior in non-corrosive properties to stainless iron, is reported to have been discovered in Sheffield.

The Ministry of Transport announces that the RAILWAY RATES TRIBUNAL and the Rates Advisory Committee have now moved to 2, Clement's Inn, Strand, London.

It is reported that the PRODUCTION OF FERTILISERS in Czecho-Slovakia is increasing. The output for 1921 is said to show a considerable increase over that of the preceding year.

In a memorandum on the Recommendations of the Committee on National Expenditure the Secretary of State for War says it is proposed to close down the CENTRAL GAS SCHOOL.

A seam of what is reported to be a high grade MANGANESE ORE has been discovered in Strathnairn, near Inverness. Mining operations have been commenced, and one shaft has been sunk to a depth of 25 ft.

LUNZER BROTHERS, chemical merchants, announce that as from to-day (Saturday) they are removing their offices to 36-37, Queen Street, London. Their telegraphic address and telephone numbers remain unaltered.

On leaving Cardiff to take up an important appointment in Belfast, MR. J. G. WILLIAMS was the recipient at Cardiff on March 17 of a solid silver cigarette case, suitably inscribed, from the staff of the British Oxygen Co., Ltd.

It is reported that a process has been discovered in France by which a volatile product which possesses the PROPERTIES OF GASOLENE has been obtained from linseed oil and similar oils by the elimination of hydrogen and water through catalytic processes.

Lecturing on Wednesday before the Royal Society of Arts on "The Permanency of Artists' Oil Colours," DR. A. P. LAURIE, Professor of Chemistry at the Royal Academy, said that more great pictures were destroyed by "restorers" than had ever been destroyed by time.

JACKSON BROTHERS & CO., chemical manufacturers and merchants, Manchester, announce that they are vacating their Stretford Works and Oldham Street office, and that on and after March 27 their address will be Hulme Hall Chemical Works, Miles Platting, Manchester.

At the annual general meeting of the Chemical Society, to be held at Burlington House, Piccadilly, London, on Thursday, March 30, at 4.30 p.m., the President (Sir James Walker, D.Sc., F.R.S.) will deliver his address. An informal meeting will be held the same evening at 8 p.m.

MR. E. G. RIPPEL, sales manager of the Buffalo Foundry and Machine Co., Buffalo, N.Y., has retired from the firm and will be succeeded by Mr. C. W. Pearson, the assistant treasurer. Mr. Rippel is a keen exponent of the use of large advertising space in technical journals, having created what is probably a world record by using a ninety-eight page inset in an American journal.

The Tehidy Minerals Co. and the Cornish Kaolin, Ltd., have entered into an agreement for the sale of the whole OUTPUT OF CHINA CLAY for some years. The latter company possesses large deposits in Cornwall, estimated to contain approximately 5,000,000 tons of china clay. The capacity of the present plant is about 12,000 tons per annum, and it is proposed to increase this to 40,000 tons.

Extensions are announced in the activities of the Alsace-Lorraine Development and Trading Co., Ltd., of Pinners Hall, Old Broad Street, London, E.C. 2, who, in addition to acting as sole agents for the potash salts of Alsace-Lorraine in the United Kingdom and Colonies, are now paying attention to the enlargement of their HEAVY CHEMICAL DEPARTMENT, which will in future embrace a much wider range of these products.

The British Consul-General at San Francisco has received an inquiry from a local company who are desirous of PURCHASING LARGE QUANTITIES of cyanide of soda, prussiate of soda, calcium chloride, and soda ash. The name and address of the company referred to, together with other particulars of interest, may be obtained by United Kingdom manufacturers and exporters on application to the Department of Overseas Trade.

"Suicide during a fit of mental depression" was the verdict returned by the jury at AN INQUEST on Arthur Harold Green, a student under Professor A. G. Perkin in the dye and chemistry department of Leeds University, who poisoned himself with potassium cyanide. It was stated that Green, who was receiving a Government training grant, had been warned that this would be discontinued owing to his unsatisfactory progress.

At a recent meeting of Glasgow Corporation Gas Committee it was reported that a special sub-committee had received a deputation from the SULPHURIC ACID MANUFACTURERS' ASSOCIATION relative to the Association's proposals regarding the department's sulphuric acid supply. The sub-committee agreed to delay consideration of the representations until the offers for sulphuric acid supply (as from the beginning of June next) were under consideration.

The following have been elected officers of the OPTICAL SOCIETY for 1922-3:—President: Sir Frank Dyson; Vice-Presidents: Professor F. J. Cheshire, Messrs. T. Smith, R. S. Whipple; Treasurer: Major E. O. Henrici: Secretaries: Professor Alan Pollard, Mr. F. F. S. Bryson; Librarian: Mr. J. H. Sutcliffe; Editor of Transactions: Dr. J. S. Anderson. Professor A. A. Michelson of the University of Chicago, and Dr. M. von Rohr, of the firm of Carl Zeiss, have been elected honorary Fellows.

THE PREMIER ELECTRIC WELDING CO., LTD., announce that, with a view to increasing the efficiency of their organisation, they have decided to concentrate a number of their departments in the London area. Arrangements are being made to transfer the head office, technical and research laboratories, and electrode factory to Abbey Wood, London, and the company request that all communications on and after March 23 may be addressed to the Premier Electric Welding Co., Ltd., Abbey Wood, London, S.E. 2. Telegrams, "Premelwel, Abwood, London." Telephone, Woolwich 866.

At a meeting of the Bristol and South Wales Section of the Institute of Chemistry, held on March 14, presided over by Mr. E. Russell (City Analyst), Mr. S. G. W. Marlow opened a discussion on "THE STATUS AND REMUNERATION OF CHEMISTS," in which the ambiguous use of the word "chemist," as applied to both the pharmacist and laboratory assistant, as well as to the qualified member of the Institute of Chemistry, was commented on. The need for proper realisation of the value of chemists' work in regard to industry, and for better organisation and co-operation of scientific bodies was also discussed, though it was conceded that matters have much improved of late years.

Much interest is being taken in Wales in a venture set on foot in the Pontrhydygroes district, North Cardiganshire, in which there are dumps of waste material, estimated to amount to 150,000 tons, lying on the sites of the now inactive zinc and lead mines. The Cambrian Electrolytic Zinc Co., Ltd. proposes to apply the electrolytic process to the blende ore for the PRODUCTION OF ZINC. Although this process has not been employed to any large extent in this country before it has been adopted with great success in British Columbia and Tasmania. It is said that North Cardiganshire offers an excellent field for an experiment in the electrolytic deposition of zinc, especially as there is abundant water power that can easily be utilised.

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Abstracts of Complete Specifications

175,050. CLAY, TREATMENT OF. W. Feldenheimer and W. W. Plowman, 20 Holborn Viaduct, London, E.C. 1. Application date, November 8, 1920.

In the purification of clay by suspending it in a liquid medium by means of a peptising agent, and allowing the impurities to separate, it has been found that the deflocculators usually employed do not operate successfully with some clays, or the limits of concentration necessary for suspension of the clay are too close for commercial working. It has been found that these disadvantages are avoided by using as a deflocculator an alkali resinate, or a resin acid in conjunction with an alkali or alkali salt which yields a water soluble derivative. The preferred reagents are solutions of ordinary rosin in caustic alkali, alkali silicate, or carbonate. Some clays which are amenable to treatment with one of these reagents cannot be treated with the others, and in some cases mixtures of these reagents must be used.

175,077. DIALKYL SULPHATES, MANUFACTURE OF. British Cellulose and Chemical Manufacturing Co., Ltd., 8, Waterloo Place, London, S.W.1, and W. Bader, of British Cellulose and Chemical Manufacturing Co., Ltd., Spondon, Derby. Application date, November 12, 1920.

The process is for manufacturing neutral alkyl sulphates from alkyl hydrogen sulphates or mixtures of these with other substances. The starting substance may be obtained by mixing a primary alcohol with sulphur trioxide or with fuming or ordinary sulphuric acid, or by absorbing an ethylenic hydrocarbon or an alkyl ether in sulphuric acid, or by decomposing a salt of an alkyl suphuric acid by a strong mineral acid. These products usually contain sulphuric acid, free alcohol, water, ether, &c., in addition to the alkyl hydrogen sulphate, and it is found that when they are distilled considerable loss takes place by the conversion of the alkyl hydrogen sulphate into various by-products as well as into dialkyl sulphate. In the present invention this loss is avoided by distilling under a high vacuum and a correspondingly low temperature, which in the case of ethyl hydrogen sulphate may be 100°-150°C. The products are continuously removed from the distillation zone of the still which contains only a small proportion of the liquid undergoing distillation.

175,201. BORAX AND BORIC ACID, PROCESS FOR MANUFACTURE OF. A. Kelly, 57, Chancery-lane, London, W.C.2 and R. B. R. Walker, 23, Melrose Road, London, S.W. 19. Application date, March 3, 1921.

Sodium pentaborate is mixed with sodium chloride and treated with concentrated ammonia solution. Borax is crystallised out from this solution, and the crystals washed. The ammonia may be recovered by distillation, in which case boric acid is also liberated. If the amount of borax present in the liquor is insufficient to liberate the whole of the ammonia, the residue may be treated with lime to liberate the remaining ammonia.

175,330. CELLULOSE FROM VEGETABLE MATTER, PROCESS OF OBTAINING. G. J. Bustamante, Werberkè Cottage, Glenore, South Hadley, Mass., U.S.A. Application date, October 1, 1920.

The process is for obtaining pure cellulose from fibrous vegetable matter. The raw material is dried, immersed in cold water, and separated into fibres. A layer of the material is then covered with a layer of anhydrous lime, and a cold alkaline solution of 2°-4°Bé. is sprayed on to it. This is followed by a spray of ammonia, then by hydrochloric acid, and then by sulphuric acid. The material remains in the acid for six hours, and is then comminuted by mechanical means, and finally washed with cold water. The cellulose may then be treated in a similar bath, to which a bleaching agent is added before the ammonia.

175,333. ORES AND THE LIKE, TREATMENT OF. A. C. Vivian, 32, Castleton Mansions, Riverview Gardens, Barnes, London, S.W. Application date, October 7, 1920.

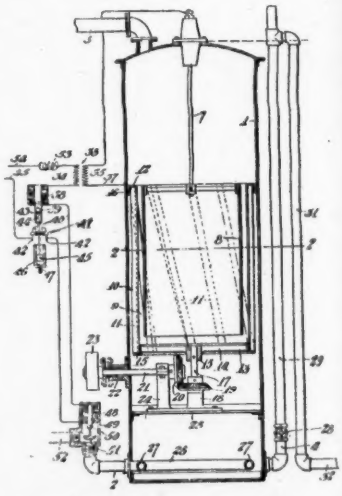
The process is for treating ores, concentrates, and other heterogeneous materials containing metals as a preliminary to the separation of the metals by froth flotation, electrostatic separation, amalgamation, or the di-electric method. For this purpose the particles of metals or metal compounds are coated with a layer of a metal or metalloid, preferably arsenic, by wet precipitation methods. The raw material may be treated with a solution of an arsenic compound from which the metal or metalloid precipitates spontaneously on the metalliferous particles, or with a solution from which the metal or metalloid may be precipitated by adding a metal such as zinc dust. In an example, a pulp containing cassiterite is mixed with a copper salt, then acidified and finely divided zinc or iron added. The mixture is agitated so that the metal is brought into contact with the cassiterite so that the latter becomes coated with copper by electrolytic action. In some cases copper salts may be present in the ore so that the addition of iron or zinc only is necessary. The precipitation may also be effected in an alkaline solution, copper salts being for instance added to a liquor containing tartrates or arsenites together with aluminium or zinc to precipitate the copper. If an arsenite is used the precipitate may be an alloy of arsenic and copper.

175,348. POTASSIC ROCKS, PROCESS FOR THE SEPARATION OF THE CONSTITUENTS OF. G. A. Blanc, 56, via Fontanella di Borghese, Rome, and F. Jourdan, 186, via del Babuino, Rome. Application date, October 15, 1920.

The process is for obtaining potassium salts from leucite which usually contains potash, soda, silica, alumina, iron oxide, lime, and magnesia. The raw powdered material is passed through a furnace having zones of progressively higher temperature ranging from 300° to 600°C., and a current of hydrochloric acid gas and water vapour is passed through in the opposite direction. Chlorides of iron, aluminium, calcium, and magnesium are produced at the lower temperatures and decomposed at the higher temperatures so that the hydrochloric acid may be recovered and used again. The chlorides of potassium and sodium are not decomposed, and are dissolved out from the insoluble residue discharged from the furnace. The hydrochloric acid may be produced from potassium chloride obtained in the process, the mixture of vapour and acid being led directly into the furnace.

175,352. DEHYDRATOR. F. W. Harris, 954, South Vermont, Los Angeles, Cal., U.S.A. Application date, November 3, 1920.

Petroleum emulsions obtained in the production and transportation of oil contain globules of water, some of which are sufficiently large to be separated by gravity and others are so small that no separation occurs even after long standing. When such emulsions are treated electrostatically it is found that the water particles tend to coalesce into larger drops of sufficient size to settle by gravity, but that the drops tend to form into chains which short-circuit the electrodes unless a very high potential is maintained For example, with Californian emulsions a potential of over 50,000 volts is necessary, and with very light oils a potential of over 200,000 volts is necessary. In this invention these very high voltages are avoided by agitating the emulsion in the electric field. An inner stationary electrode 8 is suspended by insulators 7 from the top of a closed tank 1. This is surrounded by an outer rotating electrode 10 in the form of a cage of inclined angle irons 11 secured to rings 12, 13. This electrode is rotated by means of a shaft 17 and gearing 20. The emulsion is introduced through a perforated pipe 26 and purified oil is drawn off through a pipe 3 at the top, while the water is drawn off from the bottom through a pipe 4. An alternating potential of 5,000 to 15,000 volts is obtained between the electrodes by means of a transformer 33, the primary coil of which is



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connected in series with an overload relay 38, controlling a switch 42 in series with a solenoid-operated valve 48, 51. The electrode 10 is rotated at about 50 revs. per min., which effects a slow circulation and rotation of the oil downwards between the electrodes and then upwards through the fixed electrode. Water is separated and settles out by gravity, but if any short-circuiting drops are formed, the current increases, the switch 42 is opened, and the valve 51 then closes and stops the flow of oil. A slow-return dash-pot 46 is provided so that the current and the flow of oil are not resumed for about 20 seconds, thus giving the water an opportunity to settle. The rate of supply of the emulsion to the dehydrator is thus automatically adjusted according to its water content.

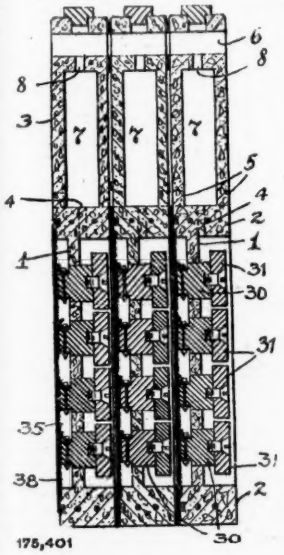
175,384. GOLD, RECOVERY OF, FROM PYRITIC ORES. R. J. Lemmon, 5, Barrington Mansions, Gresham Road, London, S.W. 9; H. S. Sulman, 44, London Wall, London, E.C. 2, and Minerals Separation, Ltd., 62, London Wall, London, E.C. 2. Application date, November 11, 1920.

In the usual treatment of auriferous pyritic ore, the ore is crushed and subjected to amalgamation and cyanide treatment, but in the present process a concentrate is obtained so that the bulk of the material to be treated is substantially reduced. It has been found that if the ore is subjected to a froth flotation process, which ensures the substantially complete recovery of the pyrites, the recovery of the gold will also be substantially complete. The ore is crushed and mixed with water and then subjected to froth flotation in a neutral or slightly alkaline condition, using a frothing agent containing phenol and/or cresol. The preferred frothing agents are unwashed coal tar or wood tar, with or without cresol and with or without blast furnace creosote. To prevent the flotation of the gangue particles with the ore, a small proportion of one or more hydrocarbons of the paraffin series is added. If the pulp from which the pyrites and gold are removed is then treated with a soluble mineral compound, such as ferrous sulphate, and an alkaline sulphide, which precipitates ferrous sulphide, it is possible to treat the pulp for the recovery of a further concentrate of pyrites and gold.

175,390. HYPOCHLORITE SOLUTIONS, ELECTROLYTIC APPARATUS FOR PREPARING. D. M. Rogers and A. T. Masterman, 125, Bunhill Row, London, E.C. 1. Application date, November 12, 1920.

A frame for carrying the electrodes is constructed of vulcanite and is open underneath and on two opposite sides near the top so that the electrolyte may circulate upwards through the frame. A shelf is provided on each side below the side opening, having a removable cover, the opening being submerged when the frame is placed in the tank. The opposite electrodes are arranged alternately in groups connected to twobus bars. The apparatus is suitable for preparing hypochlorite solutions from brine for bleaching, disinfecting, and analogous purposes.

175,401. ELECTROLYTIC CELLS. G. Harrison, London. From the Dow Chemical Co., Midland, Mich., U.S.A. Application date, November 15, 1920.

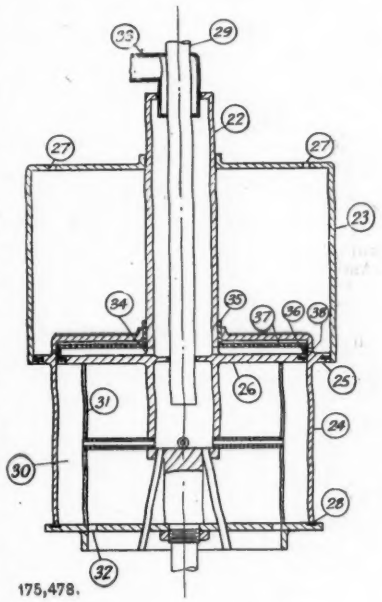


175,401

This electrolytic cell is particularly suitable for the electrolysis of solutions such as sodium chloride for the production of caustic soda and chlorine. Each element consists of a flat plate 1 (shown in vertical section) surrounded by a deep flange 2 on the anode side and a shallower flange on the cathode side. The structure is extended upwards to form a hollow space 7, having openings 5 for the passage of brine, which are in alignment with those of the adjacent spaces. Each space 7 communicates by an opening 8 with a transverse passage 6 for the flow of gas, and by an opening 4 with the anode space of the cell. The spaces 7 occupy only the central portion of the breadth of the plates 1, and the cathode spaces of the cells communicate with a transverse passage situated in an extension above the upper edge of the frame. Each electrode consists of cylindrical blocks 30 of graphite, secured to flat slabs 31 of graphite, which approach one another closely at their edges, so that the anode consists of a large composite carbon plate. An iron screen 35 is attached to the cathode ends of the blocks 30, and the edges of the screen are secured to the frame. The screen is entirely covered by a porous diaphragm 38. When the elements are assembled, the slabs 31 are slightly spaced from the screen. The solution to be electrolysed is maintained at a uniform height in the spaces 7, and during electrolysis it percolates through the diaphragms 38 and fills the cathode chambers to a height determined by an adjustable draw-off pipe in each compartment. The chlorine produced is collected in the chambers 7 and drawn off through the passage 6. The hydrogen is similarly drawn off through the transverse passage connected to the cathode compartments. The electrodes of each element are connected together in such a way that any desired cell may be cut out of the electric circuit and its communicating passages such as 8 may be closed.

175,478. CENTRIFUGAL SEPARATORS. R. A. Sturgeon, Central Iron Works, Huddersfield, Yorks. Application date, December 13, 1920.

In this machine centrifugal separation is combined with filter-pressing, the pressure being obtained by the centrifugal head of the liquid. A hollow spindle 22 carries a cylinder 23, and a cylinder 24 which is capable of reciprocation within the cylinder 23. The cylinder 24 carries a sliding piston 25 and works over a piston 26 fixed to the spindle 22. If water is admitted to the cylinder 23 it forms an annular wall up to the level of the overflow openings 27 and forces down the piston 25 and cylinder 24 to make a joint at 28. The mixture to be separated is now admitted through the pipe 29, from which it passes through radial passages to the annular space 30. The liquid filters back through the filtering medium 31 and passes out through openings 32.



175,478.

Solid material remains in the space 30 until full. Water is then admitted through the pipe 33 and passes through openings 34 into the space above the piston 26, so that the cylinder 24 is lifted and the solid material is discharged. On reaching the top, the sleeve 35 is pressed downwards, thus opening the ring valve 36 and allowing water to escape through openings 38 into the cylinder 23. The downward pressure finally forces the cylinder 24 downwards again, and the cycle is repeated. Several other simpler forms of the apparatus are described, operating on the same principle, but without the automatic discharge of the separated material. In one case the supply of raw material is automatically cut off when the machine is fully charged with the separated solid material.

175,501. HYDROGEN AND MIXTURES OF HYDROGEN AND NITROGEN, MANUFACTURE OF. J. Harger, Grange Hollies, Gateacre, Liverpool, and Woodcroft Manufacturing Co., Ltd., 41, Castle Street, Liverpool. Application date, December 30, 1920.

Air and steam are passed through incandescent coke and the resulting producer gas passed through a heat interchanger to a scrubber for removing tar and sulphur compounds. The gas is reheated by passing back through the heat interchanger, and is then passed through retorts containing iron oxide to reduce the latter. The spent gas is used to work a gas engine,

and the hot exhaust gases are used to maintain the temperature of the iron oxide, and are finally used to raise steam. The steam is employed in the producer and also for making hydrogen by passing over the reduced iron. The activity of the iron oxide is preferably increased by mixing with a catalyst, and two separate groups of retorts are employed, one being reduced while the other is being oxidised. To produce a nitrogen-hydrogen mixture, the spent producer gas is mixed with steam and passed over a catalyst to convert the carbon monoxide and steam into carbon dioxide and hydrogen, the former being then removed.

175,517. NITROGEN COMPOUNDS, PRODUCTION OF BY THE ABSORPTION OF NITROGEN IN A MIXTURE OF REACTION. C. T. Thorssell and H. L. R. Lunden, Kopmansgatan 20, Gothenburg, Sweden. Application date, January 19, 1921.

The process is for producing nitrogen compounds by absorbing pure nitrogen in a mixture of alkali metals or alkaline earth metals or their compounds and carbon. In this process, the absorbent material has been used in pulverulent form and in the form of briquettes, but these involve difficulties owing to the baking together of the absorbent or its adhesion to the walls of the shaft furnace in the hot reaction zone. It is found that these difficulties are avoided if the material is used in the form of spherical pieces having a diameter of 1-2 centimetres and a hardness of at least 2 according to the mineralogical scale.

NOTE.—Abstracts of the following specifications which are now accepted appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention: 153,918-9 (E. Merck, Firm of) relating to tripinone mono-carboxylic acid esters, *see* Vol. IV., p. 134; 154,153 (Chemische Fabriken Worms Akt.-Ges.) relating to tanning materials, *see* Vol. IV., p. 165; 155,299 (W. North and H. Loosli) relating to production of zirconium, *see* Vol. IV., p. 230.

International Specifications not yet Accepted

174,086-7-8. CRACKING HYDROCARBON OILS. Gulf Refining Co., Frick Building Annex, Pittsburg, Pa., U.S.A. (Assignees of W. F. Faragher and W. A. Gruse, Mellon Institute of Industrial Research, Pittsburg, Pa., U.S.A.). International Convention date, January 15, 1921.

174,086. The method adopted in 174,085 (THE CHEMICAL March 18, p. 354) is applied to a still of the water-tube-boiler type. The gas is injected into the shorter vertical tubes connecting the inclined heating tubes with the vapour drum above. Alternatively, the gas may be generated within the vertical tubes, by cracking the oil therein by means of an electric heater, consisting of carbon rods insulated by porcelain. The still is maintained at 60-500lb. per square in. pressure.

174,087. The method adopted in 174,085 is applied to a horizontal cylindrical still. In one form, parallel vertical longitudinal baffles are used, and the gas is injected between pairs of baffles to circulate the oil upwards. In another form the gas is injected between the still wall and a parallel cylindrical baffle plate.

174,088. This is similar to 174,087, except that the parallel vertical baffles are arranged at right angles to the axis of the still instead of parallel to it.

174,089. CRACKING OILS. Standard Oil Co., Bayonne, N.J., U.S.A. International Convention date, January 15, 1921.

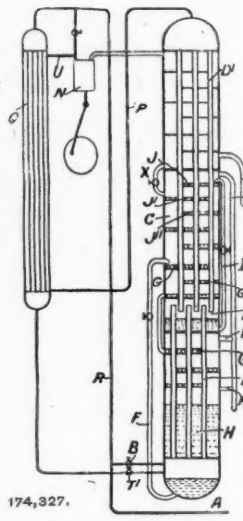
Heavy Mexican crude petroleum is fed through a heat interchanger to a sinuous pipe heated by a furnace. The velocity of the oil through the pipe is such that the temperature at the exit is about 800°F., and there is no substantial deposition of carbon. The velocity may be increased by injecting steam, water, oil-gas, or flue gas. The oil then passes into drums heated to about 900°F., in which coke deposits are formed. A large yield of low boiling products is obtained.

174,321. HYDROGENATING HYDROCARBONS. M. Melamid, 9, Urachstrasse, Freiburg, Breslau, Germany. International Convention date, January 15, 1921. Addition to 171,367.

Specification 171,367 (see THE CHEMICAL AGE, Vol. VI., p. 48), describes the treatment of tar oils, mineral oils, or other hydrocarbons with hydrogen in the presence of tin at a pressure of 15-30 atmospheres to produce low-boiling hydrocarbons. In this invention the hydrogenation may be effected at atmospheric pressure by passing the hydrocarbon vapour mixed with a large excess of hydrogen between red-hot baffle plates and heating the finely divided material slowly to redness.

174,327. SEPARATING HYDROGEN FROM GASEOUS MIXTURES. L'Air Liquide, Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude, 48, Rue St. Lazare, Paris. International Convention date, January 21, 1921.

The apparatus is for separating hydrogen from a mixture containing nitrogen, methane and carbon monoxide, such as that obtained by purifying coke oven gases, by a process of fractional liquefaction. In starting, the mixed gases are passed through a pipe R to an expansion device N, and then through a liquefier Q and pipe P to the top of the separating column C. Liquefaction gradually takes place in the lower portions of the column. In normal working, the gas is passed into the bottom of the column through a valve B, and impure methane is collected and passed through the pipe F to the middle of the column. The liquid passes downwards over plates G, G′, G″, and is purified by vapour rising through tubes D. Pure methane may be drawn off by the pipe K from the space H. The mixture of liquefied nitrogen and carbon monoxide which collects in the space E′ is passed through a pipe I to the plate J from which it passes over plates J′, J″, where it is rectified by vapour rising through tubes D′. A mixture of hydrogen and nitrogen collects at the top of the column and is passed through a pipe P and liquifier Q to an expansion device N. The exhaust from the latter is passed round the tubes D′ to cool them. Liquid nitrogen is drawn off by a pipe X to the plate J′, and pure hydrogen is drawn off by a pipe V. Nitrogen, carbon monoxide and methane which are drawn off at the outlets K, K′, L are passed through a heat interchanger before being utilised.



174,327.

174,336. DISTILLING COAL, OIL, &c. Trent Process Corporation, 1440, U Street, Washington, U.S.A. (Assignees of W. E. Trent, 908, G Street, Washington, U.S.A. International Convention date, January 20, 1921.

Substances such as coal, oil, a mixture of coal and oil, shale, oil sand, ore, &c., are heated to about 350°C. in the form of powder or film, and the volatile oil vapour is immediately withdrawn. A series of hollow circular hearths are mounted on a rotating hollow vertical shaft, and furnace gases are circulated through the hearths by baffles. The rotating hearths are arranged alternately with a series of fixed annular hearths, and the material passes from one to the other in succession. The hearths are provided with projections to agitate the material, and vapour is drawn off separately from each hearth.

LATEST NOTIFICATIONS.

176,747. Process for the production of a liquid washing blue and bleaching substance. Reichelt, J. J. March 8, 1921.
176,761. Apparatus for moulding and cooling soap. American Cotton Oil Co. March 5, 1921.
176,770. Method for the separation of chlorides of aluminium and potassium present in mixed solutions obtained in the treatment of leucite. Blanc, G. A. March 7, 1921.
176,779. Process for the manufacture of hydrogen, carbonic oxide, or mixtures of these gases. Norsk Hydro-Elektrisk Kvælstofaktieselskab. March 9, 1921.
176,785. Manufacture of magnesia or magnesium carbonate from materials containing magnesium and calcium. Simon, T. March 7, 1921.
176,802. Process of manufacturing carbon bodies. Naamloze Vennootschap Philips' Gloeilampenfabrieken. March 12, 1921.
176,811. Manufacture of anhydrous chlorides. Consortium für Elektrochemische Industrie Ges. March 11, 1921.

Specifications Accepted, with Date of Application

155,577. 3 : 3'-diamino-4 : 4'-dioxy-arsenobenzene, Manufacture of derivatives of. G. S. Haus (Firm of). December 12, 1919.

156,250. Paints, varnishes, polishes, and the like, Production of. Akt.-Ges fur Anilin Fabrikation. December 18, 1915.

156,594. Paraffin and highly viscous lubricating oils from lignite tar and shale tar, Process for obtaining. E. Erdmann. January 22, 1918.

156,695. Highly viscous lubricating oils from peat tar, Process for obtaining. E. Erdmann. September 9, 1919. Addition to 156,594.

158,250. Electro-chemical gas reactions, Method and apparatus for. H. Spiel. July 19, 1917.

159,469. Chromium alums, Process for the manufacture of. G. H. Hultman. March 1, 1920. Addition to 138,594.

160,169. Rubber latex, Processes and apparatus for rolling freshly coagulated. Soc. Anon. Compagnie des Caoutchoucs de Padang. March 15, 1920.

176,034. Cellulose acetate products, Treatment of. British Cellulose and Chemical Manufacturing Co., Ltd., and L. G. Richardson. September 28, 1920.

176,038. Acridine derivatives, Manufacture of therapeutically active. O. Y. Imray (*Farbwerke vorm. Meister, Lucius, and Bruning*). October 14, 1920.

176,099., 176,100-1-2. Distilling oil, Apparatus for. T. E. Robertson. (*Power Specialty Co.*) November 26, 1920.

176,104. Extracting essential oils and other volatile substances, Process of and apparatus for. F. L. Usher and E. P. Metcalfe. November 26, 1920.

176,113. Gas producers with means of utilising waste heat. H. Koppers. November 29, 1920.

176,144. Catalytic synthesis of ammonia, Apparatus for. L. Casale and R. Leprester. December 2, 1920.

176,149. Low temperature distillation of solid fuel, Large scale power production by. Merz & McLellan, W. T. Bottomley, and E. G. Weeks. December 3, 1920.

176,235. Condensation of *o*-benzoyl-benzoic acid. F. W. Atack. February 9, 1921.

176,284. Acetone and Butyl alcohol, Manufacture of by fermentation. Soc. Ricard Allenet et Cie. February 28, 1921.

156,226. Ores, Apparatus for classifying according to density. E. P. F. Jalabert. September 30, 1919.

Applications for Patents

Akt.-Ges. für Anilin-Fabrikation and Bloxam, A.G. Process for dyeing furs, hairs, &c. 7884. March 17.

Benson, M. Process for raising volatilisable substances to condition of vapour. 7889. March 17.

Bibb, D. H., Hudson, H., and Knight, J. S. Apparatus for heat-treating and carbonising briquettes, &c. 7427. March 14

British Dyestuffs Corporation, Ltd., Green, A. G., and Saunders, K. H. Methods of dyeing silk and mixed fabrics containing same. 7980. March 18.

Consortium für Elektrochemische Industrie Ges. Manufacture of anhydrous chlorides. 7370. March 13. (Germany, March 11, 1921.)

Crowe, D. C. Electro-magnetic relay. 7734. March 16.

Dederich, W., and Muehlenbeim, H. Manufacture of cellulosic substances. 7711 March 16.

Gardner, J. A., and Williams, M. Production of artificial dyes. 7335. March 13.

Green, W. Ceramic material, and manufacture thereof. 7912. March 18.

Higginbotham, J. Process for extracting fats from organic tissues. 7325. March 13.

Hopkinson, E. Processes for production of fabrications of rubber and filamentary material, and products obtained therefrom. 7616. March 15. (United States, April 22, 1921.)

Imperial Trust for the Encouragement of Scientific and Industrial Research, and Schryver, S. B. Manufacture of gelatine from bones. 7627. March 15.

Soc. of Chemical Industry in Basle, and Imray, O. Y. Manufacture of intermediate products for dye-stuffs. 7968. March 18.

McIntosh, D. and G. Process of and composition for dyeing. 7556. March 15.

Minerals Separation and De Bavay's Processes, Australia, Ltd. Separation of sulphide ores. 7777. March 16.

Soc. Hydro-Electrique et Métallurgique du Palais, Helbronner A., and Jouve, A. J. B. Manufacture of chromates and bichromates. 7878. March 17. (France, March 17, 1921.)

Watson, J. K. Production of ammonium chloride. 7302. March 13.

Armstrong College Finances.

ARMSTRONG COLLEGE, Newcastle, announces that the appeal for funds having been inadequately met, it is necessary to reduce staff appointments by nine, to give up extra classes, and to increase students' fees by £10 per annum.

Oils and Fats in Germany

IN 1912 there were 130 oil-mills in Germany, employing about 15,000 persons and a capital of 150,000,000 marks. The largest mills were in Hamburg and Bremen, and then followed in order Mannheim, Stettin, Cologne, Frankfort, Heidelburg, Emmerich and Neuss. The yearly output was 600,000 to 650,000 tons of oil, and 900,000 to 1,000,000 tons of oilcake. In 1913 oilseed was imported to the value of 530,000,000 marks; vegetable oils, 50,000,000 marks; animal oils and fats, 250,000,000 marks; and oilcake, 125,000,000 marks. Notwithstanding this great and flourishing industry, the fat-loving German people had scarcely enough for their wants even before the war, and during the war the lack of oils and fats was felt more acutely than anything else, and desperate attempts were made to supplement the meagre supply.

At present the industry is largely dominated by Dutch capital, which probably controls about two-thirds of it. There is a federation of German oil-mills comprising nearly a hundred firms, with a total oil-mill capacity of 1,700,000 tons. The largest of these firms, eighteen in number and responsible for about 1,200,000 tons of the German output, are controlled by Dutch capitalists, whilst the remaining smaller firms are responsible for an output of about 500,000 tons. So far as the margarine trade is concerned, this is now practically all under one organisation, the purely German firms having come to an agreement with the Dutch combine. The arrangements with Holland are greatly to the advantage of the German oil-milling industry, since it makes the vast vegetable oil resources of the Dutch East Indies available for Germany. Otherwise Germany has not now any sources of her own from which to draw the raw material for her oil-mills, and the vigorous attempts largely to extend the cultivation of oilseed crops at home has not led to any very important results. For the year ended April 1, 1920, the total available supplies of oilseeds were 450,000 tons, or about one-fourth that of pre-war days, and of this total the home-grown oilseed crops contributed 90,000 tons. This represents an appreciable increase in the home-grown supplies, but quite an inadequate one. The crops chiefly grown were rape, poppy, sunflower, and hemp, and of these rapeseed was the most satisfactory crop. Attention is called to the fact that there seems to be room for a vast increase in the oil percentage or yield of these various seeds, reasoning from analogy with the beetroot. When beet was first cultivated in Germany for sugar its yield of sugar was only 5 per cent., and it is now 20 per cent. or more. It is doubtful, however, if the percentage yield of oil from oilseeds could be increased to this extent.

Laboratory Plant Life

IN a paper before the last meeting of the Liverpool Section of the Society of Chemical Industry, Professor I. M. Heilbron dealt with the work which he, together with Professor Baly, F.R.S., and collaborators, had carried out on the formation in the laboratory of formaldehyde and sugars, firstly under the influence of ultra-violet light, and then in ordinary daylight, under conditions comparable to those in the natural green leaf. This work had been in progress for some time in the Chemistry School of the University of Liverpool, and very considerable advance had been made. Not only sugars but the nitrogenous compounds built up by plant life were being investigated, and the results already obtained foreshadowed very important developments along those lines in the near future. This hitherto obscure field was gradually yielding its secrets under patient and continuous research, and it seemed possible that the chemistry of plant growth, with the multitudinous substances evolved therein, would prove to be explicable in simple terms, obeying the ordinary laws of chemical reactivity, and it was even possible that the methods adopted by nature within the plant cell would be reproduced in the chemical laboratory.

Lectures on Radio-Activity.

IN his third lecture on radio-activity at the Royal the Institution on March 18, Sir Ernest Rutherford said that shortest-lived substance was Actinium A., which had a half-life period of one-five-hundredth part of a second. Uranium, on the other hand, only lost half its strength in five thousand million years.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

LONDON, MARCH 23, 1922.

THERE has been an improvement in the demand for chemicals during the past week, and the volume of business reported for near delivery is fairly satisfactory.

Buyers still hesitate to anticipate their requirements, and with stocks at an unusually low ebb a strong revival in demand, which is not unlikely, would immediately influence the business. Changes in price have been comparatively few, but the general tendency is firm.

There has been quite a volume of export inquiry, but little actual business is reported.

General Chemicals

ACETONE is still inquired for, both for home trade and export, and the price is higher.

ACID ACETIC is a very firm market and a steady uptake is reported.

ACID CITRIC has advanced in price and a further improvement is indicated.

ACID FORMIC is firm in price and stocks are well taken up.

ACID LACTIC is unchanged.

ACID OXALIC is higher in price and the tendency is particularly firm. Stocks are almost non-existent.

ACID TARTARIC.—The firmer tendency is maintained, and with the approach of the season a better turnover is looked for.

CREAM OF TARTAR is higher in price for early delivery, but the forward tendency is uncertain.

FORMALDEHYDE is in better demand, and the price is inclined to stiffen.

LEAD ACETATE has been more inquired for; price unchanged.

LEAD NITRATE is uninteresting.

LITHOPONE is in fair demand, and prices do not seem likely to recede.

POTASH CARBONATE.—There are signs of a firmer market, but quite substantial second-hand supplies are still visible.

POTASH CAUSTIC.—It is impossible to realise stocks, and the market remains in buyers' favour.

POTASH PERMANGANATE is firmly held at the recent advance, and there is no doubt that makers are trying to improve the value.

POTASH PRUSSIATE is a rising market and supplies are scarce.

SODA ACETATE is rather scarce, and the price exhibits an upward tendency.

SODA BICHROMATE.—There has been a steady market, but orders are of the hand-to-mouth variety.

SODA NITRITE is rather easier, but the dip in price is believed to be only momentary.

SODA PRUSSIATE is firmer, and makers seem to be sold out for this year.

Coal Tar Intermediates

BUSINESS on the whole continues quiet, but one or two fair orders have been booked. A small amount of export inquiry is about, but prospects of bulk business as yet appear small.

ALPHA NAPHTHOL has been inquired for, and the price is firm.

ALPHA NAPHTHYLAMINE is quiet.

ANILINE OIL AND SALT are without change.

BENZIDINE BASE has been fairly interesting, but the price is steady.

BETA NAPHTHOL passes steadily into consumption at recent values.

BETA NAPHTHYLAMINE.—A small inquiry has been received.

DIMETHYLANILINE has been inquired for, and the price is steady.

DINITROCHLORBENZOL is firm, with a fair demand.

DIPHENYLAMINE is very firm, and a few decent orders have been received.

"H" ACID is in demand and quite unchanged.

PARANITRANILINE is firm, and a fair business passing. Resale parcels seem to be pretty well cleared up.

PARAPHENYLENEDIAMINE is in good demand, and the price is firm.

PHTHALIC ACID ANHYDRIDE is steady, and a fair business is passing.

Coal Tar Products

THE slight improvement in activity of coal tar products generally reported last week has been maintained, and there is a considerable amount of fresh business in the market. Prices, however, remain very easy, and the downward tendency generally is maintained.

90's BENZOL shows no change from last week, and is worth about 2s. 2d. on rails at works.

PURE BENZOL is in poor demand, and is worth about 2s. 3d. on rails in the north and about 2s. 11d. in the south.

CREOSOTE OIL is weak, and is worth 4¼d. per gallon in the north and about 5d. in the south.

CRESYLIC ACID is quoted at 2s. per gallon for the pale quality, and the dark quality is worth about 1s. 9d.

SOLVENT NAPHTHA has a very poor inquiry and is quoted at 2s. 2d. on rails.

HEAVY NAPHTHA is also uninteresting, and is worth about 1s. 10d. at works.

NAPHTHALENE.—There is practically no business doing for this product, and that is nominally worth about £5 to £7 for the crude, while the refined is quoted at £15 a ton.

PITCH.—The market remains firm and prices are unchanged.

Sulphate of Ammonia

Home trade remains active, and there is also a good demand for export, but supplies appear to be short.

Current Prices

Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	1	10	to	0	2	0
Acetone oil	ton	77	10	0	to	80	0	0
Acetone, pure	ton	77	10	0	to	80	0	0
Acid, Acetic, glacial, 99-100%	ton	55	0	0	to	60	0	0
Acetic, 80% pure	ton	47	0	0	to	48	0	0
Arsenic	ton	90	0	0	to	95	0	0
Boric, cryst	ton	60	0	0	to	65	0	0
Carbolic, cryst. 39-40%	lb.	0	0	6¼	to	0	0	7
Citric	lb.	0	1	11½	to	0	2	0¼
Formic, 80%	ton	72	10	0	to	75	0	0
Gallic, pure	lb.	0	3	4	to	0	3	6
Hydrofluoric	lb.	0	0	8½	to	0	0	9
Lactic, 50 vol	ton	40	0	0	to	43	0	0
Lactic, 60 vol	ton	43	0	0	to	45	0	0
Nitric, 80 Tw	ton	30	0	0	to	31	0	0
Oxalic	lb.	0	0	8½	to	0	0	9
Phosphoric, 1.5	ton	43	0	0	to	45	0	0
Pyrogallic, cryst	lb.	0	6	6	to	0	6	9
Salicylic, Technical	lb.	0	0	10½	to	0	1	0
Salicylic, B.P.	lb.	0	1	4	to	0	1	6
Sulphuric, 92-93%	ton	8	0	0	to	8	10	0
Tannic, commercial	lb.	0	2	9	to	0	3	0½
Tartaric	lb	0	1	4	to	0	1	4
Alum, lump	ton	12	10	0	to	13	0	0
Alum, chrome	ton	30	10	0	to	32	0	0
Alumino ferric	ton	9	0	0	to	9	10	0
Aluminium, sulphate, 14-15%	ton	12	0	0	to	13	0	0
Aluminium, sulphate, 17-18%	ton	13	10	0	to	14	10	0
Ammonia, anhydrous	lb.	0	1	8	to	0	1	10
Ammonia, .880	ton	35	0	0	to	37	0	0
Ammonia, .920	ton	22	0	0	to	24	0	0
Ammonia, carbonate	lb.	0	0	4	to	—		
Ammonia chloride	ton	60	0	0	to	65	0	0
Ammonia, muriate (galvanisers)	ton	35	0	0	to	37	10	0
Ammonia, nitrate	ton	55	0	0	to	60	0	0
Ammonia, phosphate	ton	90	0	0	to	95	0	0
Ammonia, sulphocyanide	lb.	0	3	0	to	—		
Amyl acetate	ton	170	0	0	to	180	0	0
Arsenic, white, powdered	ton	42	0	0	to	44	0	0
Barium, carbonate, 92-94%	ton	12	10	0	to	13	0	0

	Per	£	s.	d.		£	s.	d.
Barium, Chlorate	lb.	0	0	11	to	0	1	0
Chloride	ton	16	0	0	to	17	10	0
Nitrate	ton	35	0	0	to	37	0	0
Sulphate blanc fixe, dry	ton	24	0	0	to	25	0	0
Sulphate, blanc fixe, pulp	ton	15	0	0	to	16	0	0
Sulphocyanide, 95%	lb.	0	1	6	to		—	
Bleaching powder, 35-37%	ton	13	0	0	to	14	0	0
Borax crystals	ton	29	0	0	to	33	0	0
Calcium acetate, Brown	ton	8	0	0	to	9	0	0
,, ,, Grey	ton	10	0	0	to	11	0	0
Calcium Carbide	ton	16	0	0	to	17	0	0
Chloride	ton	7	10	0	to	8	0	0
Carbon bisulphide	ton	60	0	0	to	62	0	0
Casein, technical	ton	75	0	0	to	80	0	0
Cerium oxalate	lb.	0	3	6	to	0	3	9
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	11	0	to	0	11	6
Oxide, black	lb.	0	10	6	to	0	11	0
Copper chloride	lb.	0	1	3	to	0	1	0
Sulphate	ton	28	10	0	to	29	0	0
Cream Tartar, 98-100%	ton	120	0	0	to	125	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol	ton	72	10	0	to	75	0	0
Formusol (Rongalite)	lb.	0	3	9	to	0	4	0
Glauber salts, commercial	ton	4	5	0	to	4	10	0
Glycerine, crude	ton	70	0	0	to	72	10	0
Hydrogen peroxide, 12 vols	gal.	0	2	5	to	0	2	6
Iron perchloride	ton	30	0	0	to	32	0	0
Iron sulphate (Copperas)	ton	4	0	0	to	4	5	0
Lead acetate, white	ton	42	0	0	to	43	0	0
Carbonate (White Lead)	ton	40	0	0	to	44	0	0
Nitrate	ton	46	10	0	to	48	10	0
Litharge	ton	35	10	0	to	36	0	0
Lithopone, 30%	ton	25	0	0	to	26	0	0
Magnesium chloride	ton	10	0	0	to	10	10	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	8	0	0	to	8	10	0
Sulphate (Druggists')	ton	13	10	0	to	14	10	0
Manganese, Borate	ton	70	0	0	to	75	0	0
Sulphate	ton	70	0	0	to	75	0	0
Methyl acetone	ton	85	0	0	to	90	0	0
Alcohol, 1% acetone	ton	72	0	0	to	73	0	0
Nickel sulphate, single salt	ton	61	0	0	to	62	0	0
Ammonium sulphate, double salt	ton	62	0	0	to	64	0	0
Potash, Caustic	ton	34	0	0	to	35	0	0
Potassium bichromate	lb.	0	0	7¼	to		—	
Carbonate, 90%	ton	31	0	0	to	33	0	0
Chloride 80%	ton	15	0	0	to	20	0	0
Chlorate	lb.	0	0	4½	to	0	0	5
Meta bisulphite, 50-52%	ton	84	0	0	to	90	0	0
Nitrate, refined	ton	45	0	0	to	47	0	0
Permanganate	lb.	0	0	9	to	0	0	10
Prussiate, red	lb.	0	3	9	to	0	4	0
Prussiate, yellow	lb.	0	1	2	to	0	1	2½
Sulphate, 90%	ton	20	0	0	to	22	0	0
Salammoniac, firsts	cwt.	3	5	0	to		—	
Seconds	cwt.	3	0	0	to		—	
Sodium acetate	ton	25	0	0	to	26	0	0
Arsenate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	5½	to		—	
Bisulphite, 60-62%	ton	25	0	0	to	27	10	0
Chlorate	lb.	0	0	3¾	to	0	0	4
Caustic, 70%	ton	23	10	0	to	24	0	0
Caustic, 76%	ton	25	0	0	to	25	10	0
Hydrosulphite, powder, 85%	lb.	0	2	3	to	0	2	6
Hyposulphite, commercial	ton	13	10	0	to	14	0	0
Nitrite, 96-98%	ton	32	0	0	to	34	0	0
Phosphate, crystal	ton	20	10	0	to	21	0	0
Perborate	lb.	0	1	3	to	0	1	4
Prussiate	lb.	0	0	9½	to	0	0	10
Sulphide, crystals	ton	13	0	0	to	14	0	0
Sulphide, solid, 60-62%	ton	23	10	0	to	24	0	0
Sulphite, cryst	ton	13	0	0	to	14	0	0
Strontium carbonate	ton	60	0	0	to	65	0	0
Strontium Nitrate	ton	60	0	0	to	62	10	0
Strontium Sulphate, white	ton	7	10	0	to	8	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Sulphur, Flowers	ton	13	0	0	to	14	0	0
Roll	ton	13	0	0	to	14	0	0
Tartar emetic	lb	0	1	6½	to	0	1	7
Tin perchloride, 33%	lb.	0	1	2	to	0	1	4
Perchloride, solid	lb.	0	1	5	to	0	1	7
Protochloride (tin crystals)	lb.	0	1	5	to	0	1	6
Zinc chloride, 102 Tw	ton	21	0	0	to	22	10	0
Chloride, solid, 96-98%	ton	35	0	0	to	40	0	0
Oxide, 99%	ton	38	0	0	to	40	0	0
Dust, 90%	ton	47	10	0	to	50	0	0
Sulphate	ton	18	10	0	to	19	10	0

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Coal Tar Intermediates, &c.

	Per	£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	2	3	to	0	2	6
Alphanaphthol, refined	lb.	0	3	0	to	0	3	3
Alphanaphthylamine	lb.	0	2	0	to	0	2	3
Aniline oil, drums extra	lb.	0	1	0	to	0	1	1
Aniline salts	lb.	0	1	1	to	0	1	2
Anthracene, 40-50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	3	9	to	0	4	3
Benzidine, base	lb.	0	5	9	to	0	6	0
Benzidine, sulphate	lb.	0	5	9	to	0	6	0
Benzoic acid	lb.	0	1	7½	to	0	1	9
Benzoate of soda	lb.	0	1	6	to	0	1	7
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	0	4	9	to	0	5	0
Betanaphthol	lb.	0	1	9	to	0	2	0
Betanaphthylamine, technical	lb.	0	6	0	to	0	7	0
Croceine Acid, 100% basis	lb.	0	3	6	to	0	3	9
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	2	9	to	0	3	0
Dinitrobenzol	lb.	0	1	3	to	0	1	4
Dinitrochlorbenzol	lb.	0	0	10	to	0	1	0
Dinitronaphthaline	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	5	to	0	1	6
Dinitrophenol	lb.	0	2	9	to	0	3	0
Dimethylaniline	lb.	0	2	6	to	0	2	9
Diphenylamine	lb.	0	4	3	to	0	4	6
H-Acid	lb.	0	6	6	to	0	7	0
Metaphenylenediamine	lb.	0	5	6	to	0	5	9
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	6	0	to	0	6	6½
Monosulphonic Acid (2.7)	lb.	0	5	6	to	0	6	0
Naphthionic acid, crude	lb.	0	3	3	to	0	3	6
Naphthionate of Soda	lb.	0	3	3	to	0	3	6
Naphthylamin-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Neville Winther Acid	lb.	0	7	9	to	0	8	0
Nitronaphthalene	lb.	0	1	4	to	0	1	5
Nitrotoluol	lb.	0	1	0	to	0	1	2
Orthoamidophenol, base	lb.	0	10	0	to	0	10	5
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	1	6	to	0	1	9
Orthonitrotoluol	lb.	0	0	10	to	0	1	0
Para-amidophenol, base	lb.	0	10	0	to	0	10	6
Para-amidophenol, hydrochlor	lb.	0	10	6	to	0	11	0
Paradichlorbenzol	lb.	0	0	6	to	0	0	7
Paranitraniline	lb.	0	3	6	to	0	3	9
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	5	0	to	0	5	3
Paraphenylenediamine, distilled	lb.	0	10	6	to	0	10	9
Paratoluidine	lb.	0	7	0	to	0	7	6
Phthalic anhydride	lb.	0	2	9	to	0	3	0
Resorcin, technical	lb.	0	5	6	to	0	6	0
Resorcin, pure	lb.	0	7	3	to	0	7	6
Salol	lb.	0	2	4	to	0	2	6
Sulphanilic acid, crude	lb.	0	1	0	to	0	1	1
Tolidine, base	lb.	0	6	6	to	0	7	0
Tolidine, mixture	lb.	0	2	6	to	0	2	9

Potash

THE Alsace-Lorraine Trading and Development Co. report: Prices for the less concentrated grades leave little to be desired. Buyers are obtaining their immediate requirements for the most part from the cheapest grades available. In former years the volume of trade in sulphate and muriate of potash was generally fairly considerable during the spring months, but in the present season there has been a marked falling off from these higher grades. Potash is needed in larger quantities for the lighter soils, and probably the lower grades which are less costly are more suitable for these lands. For some time past the bulk of the sales has been in the form of kainit 14% and sylvinite 20% and 30%. Current quotations are as follow:

	£	s.	d.
French kainit 14%, f.o.r. in bags London	2	12	6
Sylvinite 20%, f.o.r. in bags London	3	12	6
Sylvinite 30%, f.o.r. in bags London	5	12	6
Muriate of potash 50%, f.o.r. in bags London	10	10	0
Sulphate of potash 48%, f.o.r. in bags London	14	10	0

On this basis the unit prices are as follow:

	s.	d.	
Kainit 14%	3	9	per unit
Sylvinite 20%	3	7	,, ,,
Sylvinite 30%	3	8	,, ,,
Muriate of potash 50%	4	2	,, ,,
Sulphate of potash 48%	6	0	,, ,,

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

GLASGOW, MARCH 22, 1922.

A WEEK of fairly good local trade has been experienced, but it is apparent that consumers are buying from hand to mouth.

There were a few good shipping inquiries, for alkali products especially, but the opinion is held that shippers are simply testing the market.

Makers have intimated a reduction of £1 per ton in bleaching powder, for short dated contracts.

There is nothing of special interest to report in coal tar and intermediate products.

Industrial Chemicals

ACETONE.—Market steady, but little fresh inquiry. £71 to £72 per ton asked for prompt delivery.

ACID ACETIC.—Market remains firm at same price as last week. Glacial £56/57; 80% B.P. £47/50 per ton.

ACID FORMIC, 90%.—Offered at £72 per ton ex works.

ACID GALLIC, PURE.—Small inquiry; price quoted 3s. 8d. per lb. carriage paid.

ACID HYDROCHLORIC.—Local demand for small lots, but business slow. Price 6s. 6d. per carboy ex works.

ACID NITRIC.—Price remains unchanged at £25 10s. Usual small local demand.

ACID OXALIC.—In little demand, but price firm at 8½d. per lb.

ALUM AMMONIA—Continental offers of £11 10s. c.i.f. U.K.

ALUM POTASH.—Spot lots at £15 per ton ex store.

ALUMINA SULPHATE.—Slight inquiry—14/15% at £16 10s. ex works; 17/18%, £18 10s. Cheap Continental offers 14/15%, £8 10s. c.i.f. Glasgow.

AMMONIA MURIATE.—Rather better inquiry. Price unchanged at £34 10s. f.o.r.

AMMONIA SALAMMONIAC.—Crystals quoted slightly lower at £60 per ton.

AMMONIA SULPHATE.—In steady demand. Makers' prices unchanged—25¼%, £15; 25¾%, £16 13s.

ARSENIC, WHITE CORNISH.—Price remains steady at £40 to £41 ex quay. Very poor demand.

BARIUM CHLORIDE.—Very little inquiry. Spot lots to be had at £15 per ton ex store. Continental quotations slightly cheaper.

BARYTES.—Home makers' prices unchanged. Grey £4; finest white £6 per ton f.o.r. works.

BLEACHING POWDER.—Contract prices reduced by £1 per ton. Now £13 to £14 per ton, ex station. Spot lots unchanged meanwhile at £14 to £15.

CALCIUM CHLORIDE.—Home product unchanged at £7 10s. Small local demand; cheaper Continental offers about £5 10s. per ton c.i.f. U.K.

CARBON TETRACHLORIDE, 99%.—Demand very quiet. Price £50 per ton ex wharf.

COPPERAS GREEN.—£5 per ton f.o.r. in bags. Practically no inquiry.

FORMALDEHYDE (40% BY VOL.).—Market quiet. Offered at £72 10s. per ton ex wharf.

GLAUBER SALTS.—B. P. quality quoted £7 10s. ex station; fine white commercial crystals, £5 10s. per ton ex store.

IRON NITRATE.—On offer at £30 per ton f.o.r.

LEAD (RED).—£34 10s. ex station. No change in price and in little request.

LEAD (WHITE.)—£49 ex station. No change in price and in little request.

LEAD ACETATE.—Brown quoted £35 per ton. White about £41 to £42. Continental offers of white crystals at £32 15s. c.i.f. U.K.

MAGNESITE GROUND CALCINED.—Limited inquiry. Spot lots at £12 ex store.

MAGNESIUM CHLORIDE.—Cheaper Continental offers. Quoted at £6 10s. c.i.f. Spot lots to be had at £8 10s. ex store.

POTASSIUM CARBONATE, 88/92%.—In little request. £28 per ton for spot lots.

POTASSIUM CAUSTIC, 88/92%.—Unchanged at £33 ex station for spot lots. Cheaper Continental quotations.

POTASSIUM CHLORATE.—Poor demand. Price about 4½d. to 5d. per lb.

POTASSIUM NITRATE.—A few inquiries for small lots. Price about £37 ex store.

POTASSIUM PERMANGANATE.—Slightly better inquiry, but little actual business. Price about 8½d. to 9d. per lb.

SODIUM BICARBONATE.—Remains unchanged at £11 10s. per ton ex station. Usual local demand.

SODIUM BICHROMATE.—Spot lots, 5¾d. per lb.; moderate sales.

SODIUM CARBONATE (REFINED ALKALI).—Spot lots £9 12s. 6d. ex quay. Little inquiry.

SODIUM CARBONATE (SODA CRYSTALS).—No change in price; £6 10s. ex station or quay.

SODIUM CAUSTIC, 76/77%.—£25 10s. per ton. Makers' prices unchanged and little demand for this strength.

SODIUM CAUSTIC, 70/72%.—£23 10s. per ton ex station. Makers' prices unchanged and little demand for this strength.

SODIUM CAUSTIC (POWDERED 98%).—£29 to £30 ex station. Usual demand for small lots.

SODIUM CAUSTIC (BROKEN 60%).—Remains unchanged at £26 per ton ex station.

SODIUM HYPOSULPHITE.—Pea crystals, £19 to £19 10s. ex store. Commercial, £14 per ton ex store.

SODIUM NITRITE.—A few inquiries. Price, £30 to £32 per ton carriage paid 100% basis.

SODIUM SILICATE, 140°.—Makers have reduced price by £2 per ton. Now quoting £10 to £11 ex station according to quantity.

SODIUM SULPHATE, 95% (SALTCAKE).—Home price unchanged at £4 per ton. Fair inquiry for export. Limited quantities at about £3 17s. 6d. per ton f.o.b. U.K.

SODIUM SULPHIDE, 60/65%.—Solid quoted at £21 per ton ex station.

SODIUM SULPHITE.—Price nominal. £13 10s. ex station. Practically no demand.

SULPHUR FLOWERS, £14 per ton; SULPHUR FLORISTELLA (GROUND), £13 per ton; SULPHUR ROCK, £12 per ton; SULPHUR ROLL, £13 per ton. Prices nominal. Slight inquiry for Flowers and Ground, but little actual business.

ZINC CHLORIDE.—Solid quoted at £37 per ton.

WAX PARAFFIN.—No movement; inquiries trifling.

WAX SCALE.—No movement; inquiries trifling.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

BENZALDEHYDE.—Offered at 1s. 7d. per lb., carriage paid. Lower prices from the Continent.

BETA NAPHTHOL.—Small inquiry. Price remains firm at 1s. 5d. per lb., delivered.

DIPHENYLAMINE.—Several inquiries. Price remains firm at 4s. 3d. per lb. delivered.

META NITRANILINE.—Some inquiry for the home market. Price quoted, 5s. 6d. per lb., carriage paid.

META XYLIDINE.—Small inquiry. Price quoted, 7s. 9d. per lb. on 100% basis, carriage paid.

PHTHALIC ANHYDRIDE.—Inquiry for small lots. Price quoted, 3s. per lb., carriage paid, kegs included.

PYRIDINE, 90/160.—In poor demand. Price quoted, 5s. 8d. per gallon, carriage paid.

Railway Packing Regulations

THE Railway Rates Tribunal announces that it will consider the packing regulations contained in the railway companies' proposed new classification of goods. Objections to the regulations, a copy of which may be obtained from the Secretary of the Tribunal, must be lodged with the secretary (in quadruplicate) not later than April 15. The latest decisions of the Tribunal in regard to railway rates are that ground limestone for agricultural purposes, in bags, should be in class 5, and that the railway companies' proposals in regard to artificial silk shall stand.

German Chemical Trade Notes

FROM OUR OWN CORRESPONDENT

Berlin, March 19, 1922.

THE acute shortage of soda in Germany was discussed at a meeting of the Reichsarbeitsgemeinschaft Chemie, when it was stated that the nominal monthly demand from consumers, amounting to 42,000 tons, could not be met satisfactorily much before July, and even this would be subject to the receipt of more adequate supplies of coal and better railway carriage facilities. The position created by the waggon shortage is forcibly illustrated by the fact that despite the demand for soda, the largest soda factory in Bernburg has an accumulation of 6,000 tons awaiting transport.

During February the home demand for nitrogenous fertilisers improved and export business was more active. The importation of 20,000 tons of Chilean saltpetre has been sanctioned in order partly to make up for the deficiency in nitrogen caused by the Oppau explosion. Poland and Russia are reported to have been recent purchasers of saltpetre.

Generally speaking the Leipzig Fair has been a distinct success. This cannot be said of the Chemical Section, however, as very few of the leading chemical and dyestuff manufacturers were represented. The section certainly gave no indication of the capacity of the German chemical industry.

Many inquiries for industrial chemicals, received in some volume during the past week, failed to materialise owing to an increasing shortage of spot goods, and business has been erratic. Although no large business was transacted, the tendency of price movements has been towards higher levels. Alkalis are very scarce. In regard to coal tar products, the past week has been fairly quiet with little change in price. The main feature in pharmaceuticals has been potassium bromide, which has met with a good demand; prices generally are stiffening. There is very little change in the market for paint materials. The following quotations are given in marks per kilogram, unless otherwise stated (d. = domestic price, e. = export price).

Acetic Acid, 50%, chemically pure, 16 mk. d.; 80%, 30 mk. d.; 35/38 mk. e.; glacial, 98/100%, 45 mk. d.; 50 mk. e.; very scarce and no offerings from factories. Acetyl Salicylic Acid, 245 mk. d.; 320 mk. e. Benzoic Acid in brisk demand for export at 75 mk. d.; 80/85 mk. e. Boric Acid.—Numerous orders from abroad could not be fulfilled at limits fixed by purchasers; powdered, 71/77 mk. d.; crystallised, 70 mk. d. Formic Acid, 85%, 24 mk. d. Salicylic Acid, 115 mk. d.; 120/125 mk. e., in good demand. Tartaric Acid in brisk demand for home trade; price stands at 115/120 mk. d.; 125/135 mk. e. for powdered and crystallised. Alum, Chrome, 15%, 27/28 mk. d.; 33 mk. e. Alumina Sulphate, 14/15%, 6.50/7 mk. e.; 17/18%, 9/10 mk. e. Ammonia Carbonate, powdered, 17/18 mk. d.; 23.50 mk. e.; in lumps, 25 mk. d.; 32 mk. e.; the market is firm. Barium Chloride, crystallised, 10/12 mk. d.; 14/14.50 mk. e. Bleaching Powder has advanced to 12.50 mk. e. Borax.—The convention advanced their prices, and quotations are: powdered, 34.50 mk. d., 39 mk. e.; crystallised, 38.25 mk. d. and e. Calcium Carbonate, precipitated, 12 mk. d. Calcium Chloride, 70/75%, 4.75 mk. e.; 90/95%, 5.50/6 mk. e. Copper Sulphate, 98/100%, 25/28 mk. d.; 29/35 mk. e.; in brisk demand for export. Magnesium Chloride, fused, 5.75 mk. e.; short supplies. Potassium Carbonate, 80/84%, 18/19 mk. d.; 90/95%, 19/21 mk. d.; 96/98%, 25 mk. d., 29/31 mk. e. Potassium Caustic, 88/92%, 25.50 mk. d.; 31/32 mk. e.; liquor, 50° Bé, 14/15 mk. d.; 18.50/19.50 mk. e.; demand brisk. Potassium Chlorate, 26/30 mk. d., 31/34 mk. e, but no offerings from factory. Potash Metabisulphite.—Demand was chiefly confined to export lots; prices are: large crystals, 40 mk. d.; 46 mk. e.; small crystallised, 39 mk. d., 45 mk. e. Salt Cake, 3.50 mk. d., 3.50/4.50 mk. e. Soda, crystallised, 4.50 mk. d., 4.75/5 mk. e. Soda Ash, 96/98%, 9.50/10.50 mk. e.; supplies are scarce. Soda, Caustic, 125/128°, 27 mk. d.; 25/27 mk. e. Soda Silicate, 38/40°, 3.20 mk. d.; 5.50 mk. e. Soda Sulphide, 30/32%, 15 mk. d., 18 mk. e.; 66/62%, 19/22 mk. d.; 21.50/25 mk. e.; offerings hardly obtainable. Sulphur in lumps, 9 mk. d. Zinc Chloride, 17/19 mk. d., 20 mk. e. Red Lead, 33 mk. d.; 34 mk. e. White Lead, powdered, 34 mk. d, 35 mk. e.; in oil, 32 mk. d., 33 mk. e. Litharge, 31 mk. d., 33 mk. e. Lithopone, red-seal, 15/16 mk. d.; 19.50/21 mk. e. Zinc White, red-seal, 32 mk. d.; 37/38 mk. e. Benzaldehyde, 60 mk. d., 65 mk. e. Coal Tar, crude, offered at 3.10/3.20 mk. d. ex Upper Silesian station, second-hand. Naphthalene, crude, centrifuged, 2.50/2.55 mk. d.; hot pressed, 5.70/5.80 mk. d., ex factory; pure, in flakes, 12 mk. d.; 15.75/16.50 mk. e.; considerable sales for abroad have diminished stocks. Tetraline can be had at 16.50 mk. d. in tank wagons.

An Australian Appointment

MR. J. A. BRADBURY, research chemist to the Mount Lyell Co., Tasmania, has been appointed science master of the Technical College at the Bendigo School of Mines.

Nitrate Position Improving

A Large Increase in European Consumption

IN their latest circular, dated March 17, Aikman (London), Ltd., report that arrivals of nitrate of soda amount to about 11,000 tons, and about 20,000 tons are due during the next fortnight. The market has been active throughout the fortnight with a strong demand from consumers all over Europe. Sales by the "pool" during this period amount to about 70,000 tons, and would no doubt have been larger but for the fact that Continental dealers have been fully occupied in taking delivery of the large quantities bought in advance, which were, with few exceptions, sold for March delivery. When these have been liquidated sales for April delivery on a large scale are probable. Cargo business has been confined to the sale of a few steamer lots, March-April shipment, at about 14s. per cwt. c.i.f., whereas next autumn shipment is quoted 11s. 9d. to 12s. per cwt. c.i.f. The "pool" prices for March-April delivery have been raised to the parity of £14 5s. to £15 per ton. The European deliveries for first half March amount to 130,000 tons, against 146,000 tons for the whole of March last year, and the visible supply for Europe at 15th inst. was about 628,000 tons, of which it is estimated that about 220,000 tons have already been sold, mostly for delivery during the next few weeks.

In the United States the demand has been very good, and it is estimated that the stocks held by importers in that market will be largely liquidated by the end of this month, thus paving the way for fresh sales by the Producers' Association, which during the last week has sold about 27,000 tons, March-April delivery, at 11s. and 2,000 tons May at 10s. 9d. per quintal. The price in the United States has now been advanced to the parity of about £14 to £14 5s. per ton.

Early in the fortnight a few re-sale lots of f.o.b. were reported sold at 10s. 10½d. for prompt, 10s. 2½d. May-June, 10s. 7½d. May, 9s. 1d. July, and 8s. 10d. to 9s. per quintal for July-December delivery, but as nothing is now offering the market up to June delivery is controlled by the Producers' Association at 11s. for March-April, 10s. 9d. May, and 10s. 3d. per quintal for June delivery. For later positions, however, no price has so far been fixed, notwithstanding some inquiry on the part of buyers.

The inland price in Germany was raised on the 1st inst. for synthetic nitrate of soda from 36 mk. to 46 mk. per unit of nitrogen per 100 kilogs, and for sulphate of ammonia from 29.80 mk. to 38.20 mk. per unit, and a further advance is expected at an early date. Freights are steady, with summer loading quoted about 23s. 6d. to 25s., and some fixtures of next season shipment liner space for Europe at 24s. 6d. to 25s. per ton. For the United States there is still a good demand for April-May shipment at about 22s. 6d. per ton, and several fixtures are reported.

The sulphate of ammonia market continues strong at about £21 to £22 per ton on the Continent, with available supplies at a minimum.

Mineral Wealth of Canada

SPEAKING at a recent meeting of the Canadian Institute of Mining and Metallurgy at Ottawa, Mr. C. V. Corliss, general manager of the Mond Nickel Co., said that only about 15 per cent. of the entire country was fit for profitable cultivation. Fully 90 per cent., however, was rich in minerals, ranging in value and utility from silver, gold, platinum and palladium to coal, oil, salt and building materials. In Canada only a beginning had been made. But already they had the Sudbury nickel, the Cobalt silver and the Porcupine gold areas, each of which had become world-famous, and each of which would, during its entire life, produce many hundreds of millions of dollars in gross value of metals.

Death of Dr. J. T. Mertz

WE regret to record the death on Tuesday, at "The Quarries," Newcastle-on-Tyne, of Dr. J. T. Mertz, one of the pioneers in the industrial development of electricity supply. Born at Manchester in 1840, Dr. Mertz was educated in England and Germany. In 1868 he took up an appointment with the Tharsis Copper Co., at Hebburn, and afterwards became technical manager of the company's works at Hebburn, Glasgow, and Birmingham. He also acted as manager of the Blaydon Chemical Works. He leaves a widow, two sons and a daughter.

Company News

WELSBACH LIGHT CO., LTD.—The debenture stock registers are closed until March 31, for preparation of the half-yearly interest warrants.

HADFIELDS, LTD.—A further dividend of 6d. per share is announced, making 5 per cent., free of tax for the year, for 1920 5 per cent. was paid, and for 1919 10 per cent.

HARRISONS & CROSFIELD.—A dividend is announced on the cumulative preference shares at the rate of 6 per cent. per annum for the three months ending March 31, less tax.

UNITED ALKALI CO., LTD.—The directors have decided not to pay a dividend on the ordinary shares, but announce a dividend of 4s. per share, less tax, on the preference shares.

EVANS, SONS, LESCHER & WEBB, LTD.—The directors announce that it is impossible to pay the dividend on the preference shares due on April 1, owing to the heavy losses of the past year.

TYEE COPPER CO., LTD.—A distribution at the rate of 5s. per share will be made on and after March 31 to shareholders on account of repayment of capital. It is hoped at a later date to make a further small distribution.

KENT PORTLAND CEMENT CO., LTD.—At an extraordinary general meeting on Tuesday, resolutions approving the amalgamation of the company with the Associated Portland Cement Manufacturers, Ltd., and the voluntary winding-up of the company, were approved.

BROKEN HILL PROPRIETARY, LTD.—Coupon No. 3 of the 7 per cent. "B" debentures will be paid on and after April 1, at the Commonwealth Bank of Australia, 36-41, New Broad Street, London. Coupons must be left at the bank three clear days previous to payment for examination.

INTERNATIONAL PAINT AND COMPOSITIONS CO., LTD.—At an extraordinary general meeting held in London, on March 17, resolutions were passed approving the acquisition of the issued share capital of the Standard Anti-Fouling Composition and Paint Co., Ltd., and increasing the capital of the company to £612,500 by the creation of 112,500 new ordinary shares of £1 each.

SALT UNION, LTD.—The net profit for 1921 was £162,287. After adding £23,274 brought in, and deducting debenture interest £54,000, there is an available balance of £131,561, which it is proposed to appropriate as follows: dividend of 2s. 4d. per share on the preference shares, £70,000; dividend of 1s. per share on the ordinary shares, £40,000; forward £21,561. Warrants payable on April 29 will be posted on April 28, to holders registered on March 13.

SOUTHALL BROTHERS & BARCLAY.—The net profit for 1921 was £23,631, and to this is added £10,994 brought forward, making £34,626. It is proposed to pay a year's dividend on the ordinary shares of 10 per cent., free of tax, and a bonus of 6d. per share, also free of tax; to place to reserve £6,000, and to carry forward £12,376. In 1920 the profits were £25,310; the dividend and bonus were the same; £12,000 was written off goodwill, &c., and £3,000 was carried to reserve.

ABERTHAW AND BRISTOL CHANNEL PORTLAND CEMENT CO.—The profit for 1921 was £85,376 which, with a balance brought in, leaves £125,358 for disposal. The directors have reserved £30,000 for taxation and contingencies, and after providing for preference dividends recommend a final dividend, making 15 per cent. for the year on the ordinary shares, free of tax, placing £20,000 to reserve, and carrying forward £33,327. To meet the cost of extensions and improvements at Rhoose and Aberthaw the directors are calling up 10s. per share, of which 5s. represents premium on 100,000 partly paid ordinary shares. The ordinary dividend for the previous year was the same.

LIMMER AND TRINIDAD LAKE ASPHALTE CO.—The profit for 1921 was £77,742, plus £13,603 brought in, making £91,345. The directors recommend a second dividend of 7½ per cent., less tax, on both the preference and ordinary shares, to general reserve, £34,500, leaving to be carried forward £19,788, subject to final adjustment of E.P.D. and corporation profits tax. It is proposed to capitalise £24,500 of the general reserve and to issue to the preference and ordinary shareholders 24,500 fully-paid ordinary shares of £1 each at the rate of one new share for every ten preference or ordinary shares now held. The annual meeting was held on Thursday at Caxton Hall, London.

Tariff Changes

AUSTRIA.—The following goods may now be imported under licences issuable by the Customs authorities:—Peat and peat charcoal, lignite and coal, coke and all fuels produced therefrom, perfumed waters, essential oils, coal tar oils of the benzol class; mineral oils, lignite and schist tar; lignite and schist tar oils; glue of all kinds; concentrated acetic acid, silver nitrate, prepared vinegar, fats and oils, and alcoholic aromatic essences. An export licence is no longer required for charcoal, copper vitriol and iodine preparations (except bath salts) containing iodine.

CYPRUS.—As from February 1 the importation of opium, morphine, cocaine, ecgonine, and diamorphine, and their respective salts, and any preparation, admixture, extract, or other substance containing not less than one-fifth per cent. of morphine (anhydrous) or one-tenth per cent. of cocaine, ecgonine, or diamorphine, is prohibited except with the written permission of the Chief Medical Officer.

MARTINIQUE.—Regulations regarding the importation of poisonous substances, including opium, morphine, diacetyl morphine, cocaine, &c., may be seen at the Tariff Section Department of Overseas Trade, 35, Old Queen Street, London.

MOROCCO (FRENCH ZONE).—A consumption tax to be levied on gunpowder and other explosives imported into or manufactured in the French Zone is fixed at rates, the lowest of which is 0.50 franc per kilog., the highest being 4 francs per kilog.

NEW ZEALAND.—New forms of invoice and certificates of value and origin which must be used in connexion with the importation of goods into New Zealand and also for securing entry for goods under the British Preferential Tariff were published in the Board of Trade *Journal* (March 2, p. 242).

SWITZERLAND.—As from February 15, caustic soda, liquid and solid, will be no longer subject to import permit; calcined and crystallised soda still remain subject to control.

Commonwealth Line of Steamers

THE T.S.S. *Moreton Bay*, of the Commonwealth Government line, arrived in London on Sunday afternoon, thus completing her maiden voyage, on which she left from London on December 7 last. As already reported, the port H.P. turbine gave out between Colombo and Fremantle on the outward journey, but in spite of the fact that this has been kept out of action since—it being deemed advisable to have the necessary repairs effected by the builders here—the vessel maintained an average speed of approximately 14 knots on her homeward journey.

Amongst the cargo carried from Australia is a consignment of about twenty-five thousand cases of apples. These are the first of this year's crop to reach England, and have arrived much earlier than in previous years. They are understood to be in excellent condition. The *Moreton Bay* also carried small experimental consignments of soft fruits such as apricots, peaches, grapes, pears, nectarines, and plums, in the special refrigerated chambers provided for the purpose of testing the possibilities of marketing this class of Australian produce. The results of this experiment are awaited with greatest interest, and it is already known that some of the fruits have carried most satisfactorily. The passengers speak in high terms of the ship and its comforts, many expressing their intention to return to Australia in it or one of its class.

Criticism of the Dyestuffs Act

PRESIDING at the annual meeting of the United Turkey Red Co., Ltd., in Glasgow, on Wednesday, Mr. H. W. Christie said the directors desired to direct the attention of the shareholders, as they had already directed the attention of the Government, to the evil effects of the export credit scheme. The weakness of that scheme was that it attempted to force supplies on a market which did not really require them or had not the ability to pay for them. They had reason to believe that the Government now saw the error of its ways, and gradually a sounder business with those markets should develop on old lines. The dye position showed no improvement. Dyes were being sold abroad at prices very much below those at which, owing to the Safeguarding of Industries Act, manufacturers on this side could purchase them. That Act was one of the most pernicious passed by Parliament in recent years. Its immediate repeal was called for in the interest of the export trade of the country.

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Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

GOWER, G. N., 2, Little Road, Plaistow, wholesale chemist. £17 18s. January 13.

MIDDLETON, 6, Arthur Street, Coatham, Redcar, chemist. £10 15s. 11d. December 9.

NEWMAN, A. Pointon, 51, Thompson Street, Barry Dock, chemist. £21 15s. 1d. January 20.

ROBARTES, LTD., Diadem House, Leather Lane, chemists. £30 16s. 11d. January 13.

STEWART, J. Dickson, 100, Richmond Road, Earl's Court, chemist. £13 5s. 6d. January 23.

TURNER, Dalton (a firm), 27, Holford Square, W.C., chemists. £17 10s. January 23.

WILLIAMS, D. J., 155, London Road, Croydon, chemist. £11 12s. 10s. January 12.

WINNETT, Jas., 7, Camomile Street, E.C., metallurgical chemist. £39 19s. 8d. January 3.

Receiverships

W. A. SOMERVILLE, LTD. J. S. Hassal, of 6, Lord Street, Liverpool, ceased to act as receiver or manager on March 6, 1922.

VICTORS, LTD. A White, of 26, Pall Mall, Manchester, was appointed receiver and manager on March 8, 1922, under powers contained debenture dated November 21, 1921.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, created after July 1, 1908, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July 1, 1908, require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.*]

BRITISH COLLOIDS, LTD., W.C.—Registered March 11, £10,000 debentures; general charge. *Nil. June 3, 1920.

BRITISH WINDOW GLASS CO., LTD., London, E.C.—Registered March 13. Trust Deed dated February 20, 1922, securing £200,000 debentures, present issue £152,000, general charge. *£5,000. January 20, 1922.

CUMBERLAND COAL POWER & CHEMICALS, LTD., London, S.W.—Registered March 8, £8,000 debentures part of £200,000; charged on benefits under certain agreement and 4,096 shares as and when acquired by company thereunder, also general charge. *£187,000. January 13, 1922.

FRANKLIN PROCESS, LTD., Denton, dyers, &c.—Registered March 7, £10,000 debentures, present issue £9,650, general charge. *Nil. February 24, 1921.

WILSON (M. H.) & SONS, LTD., Wisbech, chemical manure manufacturers, &c.—Registered March 9. £3,000 second debentures. *£9,000. December 12, 1921.

Satisfactions

BRITISH WINDOW GLASS CO., LTD., London, E.C.—Satisfaction registered, March 13, £5,000, registered July 22, 1921.

WELDON & WILKINSON, LTD., New Basford, bleachers, &c.—Satisfaction registered, March 8, £3,500, registered November 17, 1914.

London Gazette

Companies Winding Up Voluntarily

BALTIC WHARF CHEMICALS, LTD. H. Musgrave, of 36, Mark Lane, London, E.C. 3, appointed liquidator.

SURREY SOAPMAKERS, LTD. Winding-up resolution confirmed March 6.

Liquidator's Notice

AMALGAMATED GLASS BOTTLE WORKS, LTD. Meeting of creditors at 1, Guildhall Chambers, Basinghall Street, London, E.C. 2, on Wednesday, March 29, at 2.30 p.m.

Bankruptcy Information

BURNS, John Harris, High Street, Highley, Shropshire, chemist. Receiving order, March, 15. Creditor's Petition.

STEELE, Leslie, 7, St. Botolph's Avenue, Sevenoaks, Kent, chemist. Receiving order, March 16. Debtor's petition.

Edinburgh Gazette

ADOS CHEMICAL CO., LTD., Company winding-up voluntarily. J. L. Douglas, 135, Wellington Street, Glasgow, appointed liquidator.

New Companies Registered

ARTHUR WHARTON, LTD., Paragon Buildings, Jameson Street, Hull. Dealers in chemicals, dyes, &c. Nominal capital, £25,000, in £1 shares.

GLASGOW AND LONDON REFINING CO., LTD., Finsbury Court, Finsbury Pavement, London. Manufacturers of and dealers in soap, fats and oils, &c. Nominal capital, £80,000 in 17,000 preferred shares of £1 each, and 60,000 deferred shares of 1s. each.

JOHN SWINDELLS, LTD., manufacturers of dyes, &c. Nominal capital, £5,500 in £1 shares. A director, J. Swindells, Park Mount, Macclesfield.

LONDON OXYGEN CONSUMERS, LTD., 111, Salisbury Road, Kilburn, London. To acquire from Liquid Air, Ltd., certain plant, and to carry on, so as not to be in direct competition with Liquid Air, Ltd., the business of manufacturing and dealing in oxygen in gaseous or liquid form. Nominal capital, £7,500, in £1 shares. T. W. Ward, Ltd., and Liquid Air, Ltd., may each appoint and remove one director.

MYRTLE PAINT STORES, LTD., 64, Myrtle Street, Liverpool. Paint and varnish manufacturers and dealers. Nominal capital £500 in £1 shares.

OSMOS WATERS, LTD., manufacturers of and dealers in medicinal and mineral waters, chemicals, drugs, &c. Nominal capital, £7,000, in £1 shares. A director, A. Dawson, Crown Wharf, Hayes, Middlesex.

PEATRAL SYNDICATE, LTD., Bush Lane House, Cannon Street, London. To acquire patent wet carbonising apparatus (Patent No. 114,603); manufacturers of patent fuel and peat by-products. Nominal capital, £100 in £1 shares.

SUPERSTAINS, LTD., 253, Albany Road, Camberwell, London. Manufacturers of stains, dyes, varnishes, &c. Nominal capital, £5,000, in £1 shares.

WILLIAMS METHANOMETER, LTD., 9, Albert Square, Manchester. To acquire patents relating to appliances for the detection and registration of explosive gases. Nominal capital, £2,500 in 1s. shares.

Recent Wills

Mr. Joseph Warry, of 23, Duchess Road, Edgbaston, Birmingham, glass manufacturer £9,782

Mr. John Scoley Battle, the Red Hall, Bracebridge Heath, Lincoln, of Battle, Son, and Maltby, manufacturing chemists, and of Battle, Maltby, and Bower, sheep dippers £38,322

Dr. Edward Hopkinson, of Ferns, Alderley Edge, Cheshire, vice-chairman of the Chloride Electrical Storage Co., Ltd., and a director of Mather & Platt, Ltd. £141,675